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**CUMULATIVE**

**Index  
to  
NASA Tech Briefs**

January–December 1968



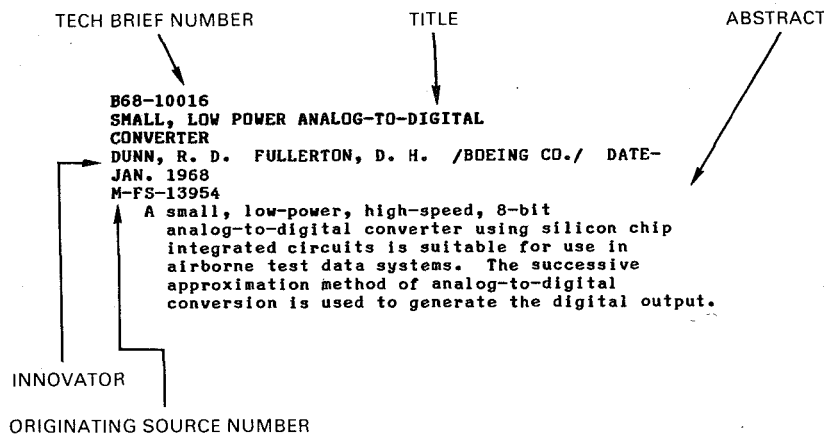
February 1969

National Aeronautics and Space Administration

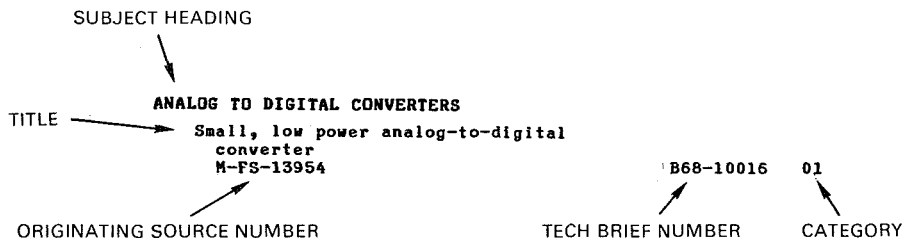
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# Introduction

This *Index to NASA Tech Briefs* lists the technological innovations derived from the U.S. space program and published during the period January through December 1968. A new five year cycle of cumulative indexes begins with this index. The Cumulative Indexes for the previous five years (1963-1967) are contained in NASA SP-5021(06) which was published in April 1968. The main section is arranged in six categories: Electrical (Electronic); Physical Sciences (Energy Sources); Materials (Chemistry); Life Sciences; Mechanical; and Computer Programs. A typical entry has these elements:



To help users locate information of value, three indexes are provided. The first is a subject index, arranged alphabetically:



Note that in this index several routes are opened for obtaining further information. If the title seems promising, the Tech Brief number and category may be used to locate the abstract, which will be found in the main section arranged sequentially by Tech Brief number within each category. Further, the Tech Brief number can of course be used for obtaining a copy of the original Tech Brief.

The second index relates all items by the originating source and number to the Tech Brief number and category.



The third index relates all items by the Tech Brief number and category to the originating source and number.





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This *Index* supplements the *Cumulative Index to NASA Tech Briefs* (NASA SP-502(06)) which was published in April 1968. The index was prepared by the Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by the Technical Information Services Company.

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## 01 ELECTRICAL (ELECTRONIC)

### B68-10001 DC PIN-TO-PIN TESTING OF INTEGRATED CIRCUITS

THOMAS, E. F. DATE- JAN. 1968  
GSFC-10284

External pin-to-pin nondestructive testing procedure measures the electrical characteristics of each element in an integrated circuit. The procedure involves choosing specific pairs of pins and applying appropriate test voltages to them.

### B68-10002 GAGE MONITORS QUALITY OF CROSS-WIRE RESISTANCE WELDS

ETZEL, J. PILTCH, A. DATE- JAN. 1968  
GSFC-90549

Gage nondestructively monitors the quality of cross-wire resistance welds during the welding operation. The gage gives a dial indication of the relative embedment of the cross wires during the actual welding operation. A direct relationship exists between the depth of embedment and both weld strength and consistency.

### B68-10003 LINEAR ANALOG DC VOLTAGE-TO-PULSE-WIDTH CONVERTER

CROCKET, W. R. DATE- JAN. 1968  
GSFC-556

Circuit converts a dc analog input signal to pulse widths that are proportional to the input signal voltage. The circuit would be particularly useful as an analog-to-digital converter where low power, ruggedness, reliability, and good linearity are prime requirements.

### B68-10007 BIMETAL SENSOR AVERAGES TEMPERATURE OF NONUNIFORM PROFILE

DITTRICH, R. T. DATE- JAN. 1968  
LEWIS-10362

Instrument that measures an average temperature across a nonuniform temperature profile under steady-state conditions has been developed. The principle of operation is an application of the expansion of a solid material caused by a change in temperature.

### B68-10008 IMPROVED PHASE LOCKED LOOP RECEIVER

DALEY, T. J. /GEN. DYN./ELECTRON./ DATE- JAN. 1968  
GSFC-09561

Improved phase locked loop receiver tracks and demodulates a signal whose signal-to-noise ratio may be low and whose information sidebands are close in frequency. This receiver recovers the carrier from input signals and applies it to a demodulator which recovers the sidebands.

### B68-10012 ONE-SHOT PULSE SHAPER CIRCUIT

RADYS, R. G. /HUGHES AIRCRAFT CO./ DATE- JAN. 1968  
XGS-11379

Pulse shaper circuit exhibits low power dissipation, self setting, and easy triggering. It is basically a magnetic one-shot multivibrator consisting of two blocking oscillators and an inhibit circuit.

### B68-10015 INPUT GATE CIRCUIT CONVERTED FOR USE AS LINEAR AMPLIFIER

HARPER, T. P. /IBM/ DATE- JAN. 1968  
M-FS-14265

Commercially available integrated circuit that is marketed as a digital computer input gate circuit was converted to a linear amplifier in a microphone circuit that has high input impedance, low output impedance, low cost, and is small enough to fit on a standard printed circuit card.

### B68-10016 SMALL, LOW POWER ANALOG-TO-DIGITAL CONVERTER

DUNN, R. D. FULLERTON, D. H. /BOEING CO./ DATE- JAN. 1968  
M-FS-13954

A small, low-power, high-speed, 8-bit analog-to-digital converter using silicon chip integrated circuits is suitable for use in airborne test data systems. The successive approximation method of analog-to-digital conversion is used to generate the digital output.

### B68-10017 REGULATED DC-TO-DC CONVERTER FEATURES LOW POWER DRAIN

THORNWALL, J. DATE- JAN. 1968  
GSFC-03429

A regulated dc-to-dc converter requires negligible standby power for the operation of critical electronic equipment. The main operating circuitry consumes power intermittently according to load conditions, rather than constantly.

### B68-10018 DIGITAL DATA AVERAGER IMPROVES CONVENTIONAL MEASUREMENT SYSTEM PERFORMANCE

NAYLOR, T. K. ROBERTS, J. A., JR. SCHELLENBACH, R. R. /RCA/ DATE- FEB. 1968  
MSC-12078

Multipurpose digital averager provides measurement improvement in noisy signal environments. It provides increased measurement accuracy and resolution to basic instrumentation devices by an arithmetical process in real time. It is used with standard conventional measurement equipment and digital data printers.

### B68-10019 CIRCUIT DETECTS VOLTAGE DECREASE IN COMPUTER POWER SUPPLY

HOUCK, W. H. DATE- FEB. 1968  
KSC-67-120

Rapid-response monitoring circuit detects voltage decrease or dropout in any single phase or all three phases simultaneously of a 3-phase 60 Hz computer power supply. It uses lamps to indicate voltage conditions and provides a digital pulse output for a chronological record of voltage irregularities.

### B68-10027 ANALYSIS OF FLUTTER IN TAPE TRANSPORT SYSTEMS

DAVIS, R. C. SIMPSON, R. S. /ALABAMA UNIV./ DATE- JAN. 1968  
M-FS-11970

Effect of flutter on digital data is recorded by magnetic tape recorders used with instrumentation systems. Major effect for both FM and direct recording techniques is shown to be a perturbation of the signal time base.

### B68-10028 ELECTRONIC APERTURE CONTROL DEvised FOR SOLID STATE IMAGING SYSTEM

ANDERS, R. A. CALLAHAN, D. E. MC CANN, D. H. /WESTINGHOUSE ELEC. CORP./ DATE- FEB. 1968  
M-FS-12428

Electronic means of performing the equivalent of automatic aperture control has been devised for the new class of television cameras that incorporates a solid state imaging device in the form of phototransistor mosaic sensors.

### B68-10030 FLARE ANGLES MEASURED WITH BALL GAGE

CLEGHORN, D. WALL, W. A. DATE- MAY 1968  
M-FS-14690

Precision tungsten carbide balls measure the internal angle of flared joints. Measurements from small and large balls in the flare throat to an external reference point are made. The difference in distances and diameters determine the average slope of the flare between the points of ball contact.

### B68-10051 THIN FILM HEAT TRANSFER GAGE IS STABLE

# 01 ELECTRICAL (ELECTRONIC)

## AT HIGHER TEMPERATURES

LOYD, J. R. PICKARD, R. F. /ASTRO-SPACE LABS./  
DATE- MAR. 1968 SEE ALSO B66-10180  
M-FS-12396

Thin film convective heat transfer gage functions effectively for prolonged periods at temperatures up to 1000 degrees F. An initial resistance shift does not inhibit the performance or accuracy of the gages, as the original resistance-temperature relationship remains unchanged.

B68-10054

## AMPLITUDE AND FREQUENCY READOUT OVERLAY

FITCH, A. E. DATE- MAR. 1968

GSFC-10183

Amplitude and frequency readout overlay simplifies the interpretation of oscillograph traces for full scale deflections of one inch. The overlay increases accuracy in data interpretation and saves time in analyzing oscillograph records.

B68-10056

## LUMINESCENT SCREEN COMPOSITION FOR

### CATHODE RAY TUBES

HILBORN, E. H. DATE- MAR. 1968

ERC-19

Screen composition for cathode ray tubes exhibits differential color of emission as a function of beam current variation at a constant accelerating voltage. The screen consists of a mixture of phosphors which emit different hues, have different current saturation values and exhibit a nonlinear current-brightness characteristic.

B68-10058

## SIMPLIFIED, HIGH-SPEED BINARY DATA

### DECODER

ANDERSON, T. O. DATE- FEB. 1968

NPO-10118

Simplified, high-speed decoder of encoded binary data received over a noisy channel is provided in a versatile apparatus that can accommodate more than one particular set of codes. The apparatus is applicable to satellite, lunar, and planetary data transmission.

B68-10059

## THERMAL SHORT IMPROVES SENSITIVITY OF CRYOGENICALLY COOLED MASER

CLAUSS, R. C. DATE- MAR. 1968

NPO-09975

In-line, quarter-wave thermal short cools the center conductor of the signal-input coaxial transmission line to a cryogenically cooled traveling wave maser. It reduces both the thermal noise contribution of the coaxial line and the heat leak through the center conductor to the maser at 4.4 degrees K.

B68-10061

## ELECTRONIC CIRCUIT PROVIDES AUTOMATIC LEVEL CONTROL FOR LIQUID NITROGEN TRAPS

TURVY, R. R. DATE- MAR. 1968

KSC-10127

Electronic circuit, based on the principle of increased thermistor resistance corresponding to decreases in temperature provides an automatic level control for liquid nitrogen cold traps. The electronically controlled apparatus is practically service-free, requiring only occasional reliability checks.

B68-10063

## PLASTIC PREFORMS FACILITATE FABRICATION OF WELDED CORDWOOD ELECTRONIC MODULES

STURMAN, J. C. DATE- MAR. 1968

LEWIS-90339

Molded plastic preform facilitates the fabrication of small lots of welded cordwood circuits. The preforms retain the components during welding and electrical checkout and facilitate encapsulation of the welded module when used with a conventional potting shell.

B68-10065

## MULTICHANNEL IMPLANTABLE TELEMETRY SYSTEM

FRYER, T. B. DATE- MAR. 1968 SEE ALSO

B64-10171, B66-10057, AND B66-10624

ARC-10083

Multichannel telemetry system is used for chronic implantation in animals to monitor a variety of physiological parameters. A hermetically sealed unit, the system uses a time-sharing multiplex scheme to commutate between various sensor inputs and enables the number of channels to be increased or decreased.

B68-10067

## SELF-CORRECTING, SYNCHRONIZING RING COUNTER USING INTEGRATED CIRCUIT DEVICES

MAASBERG, W. A. /IBM/ DATE- MAY 1968

M-FS-13901

Three nand gate circuits are used to add error detection and reset logic circuitry for initiating and retaining the correct binary state in the flip-flop circuits of a ring counter. As the input signals are counted, the position of the specified state moves in ordered sequence around circuit loop.

B68-10068

## DIVERSITY RF RECEIVING SYSTEM WITH IMPROVED PHASE-LOCK CHARACTERISTICS

DI LOSA, V. J. LAUGHLIN, C. R., JR. DATE- MAR. 1968

XGS-01222

Improved diversity receiving system automatically utilizes the combined output from its two independent receiving channels /with cross-polarized receiving antennas/ to increase the reliability of maintaining the requisite phase lock for optimum signal reception. It is adapted for use with AM, PM, or narrow band FM signals.

B68-10069

## PRINCIPLES OF OPTICAL-DATA PROCESSING TECHNIQUES

SHULMAN, A. R. DATE- MAR. 1968

GSFC-10271

Document presents optical-data processing information on a level which will convey the basic principles involved to those having a general technical background. Mathematical discussions are included but are not required for a basic understanding.

B68-10070

## DEVELOPMENT OF BIAXIAL TEST FIXTURE

### INCLUDES CRYOGENIC APPLICATION

HELFF, J. C. KELLY, R. E. KERR, D. A. WALDRON, C. R. /N. AM. AVIATION/ DATE- APR. 1968

M-FS-14185 M-FS-14189

Test fixture has the capability of producing biaxial stress fields in test specimens to the point of failure. It determines biaxial stress by dividing the applied load by the net cross section. With modification it can evaluate materials, design concepts, and production hardware at cryogenic temperatures.

B68-10073

## NEW MICROELECTRONIC POWER AMPLIFIER

NEW, T. C. /WESTINGHOUSE ELEC. CORP./ DATE- MAR. 1968

M-FS-13621

Integrated push-pull power amplifier fabricated on a chip of silicon has interdigitated power transistors and is hermetically encapsulated in a beryllia flat package. It provides current output greater than the nominal 10 amperes from an input current drive of 1 ampere.

B68-10074

## IMPROVED DC VOLTAGE MULTIPLIER

SAVELLE, C. R., JR. /SPACO/ DATE- MAR. 1968

M-FS-14042

Circuit multiplies a dc input voltage in the millivolt range to yield a larger dc output voltage bearing a fixed ratio to the input voltage. The supply voltage need not be precisely regulated, the potentiometer need not be linear, and the gain of servo amplifier is not critical.

B68-10079

## MAGNETIC TAPE TRANSPORT CONTROLLED BY ROTATING TRANSDUCER HEADS

CHUPITY, J. SALCEDO, G. SPERRY, J. D. /AMPEX  
CORP./ DATE- MAR. 1968  
GSFC-483

Magnetic tape transport includes a common drive for both the tape drive capstans and the rotating record/reproduce heads. Speed of the drive may be varied within a preselected range, but, once selected, remains constant so head and capstan are driven in synchronization and at constant speed.

B68-10083  
TWIN SOLUTION CALORIMETER DETERMINES  
HEATS OF FORMATION OF ALLOYS AT HIGH  
TEMPERATURES

DARBY, J. B., JR. KLEB, R. KLEPPA, O. J.  
/CHICAGO UNIV./ DATE- APR. 1968  
ARG-10114

Calvert-type, twin liquid metal solution calorimeter determines the heats of formation of transition metal alloys at high temperatures. The twin differential calorimeter measures the small heat effects generated over extended periods of time, has maximum operating temperature of 1073 degrees K and an automatic data recording system.

B68-10084  
GYRATOR-TYPE CIRCUITS REPLACE UNGROUNDED  
INDUCTORS  
DEBOU, G. J. DATE- MAR. 1968  
XAC-10608

Gyrator circuits using only transistors, capacitors, and resistors which can replace both grounded and ungrounded inductors have been developed to permit complete microminiaturization of circuitry by integration of the components.

B68-10086  
METHOD OF DISJOINING ADHESIVELY BONDED  
ELECTRONIC CORDWOOD MODULES  
SACRAMONE, P. J. /RCA/ DATE- MAY 1968  
MSC-12060

Embedment of resistive heating elements in a cordwood module used for packaging electronic components, facilitates separation of the adhesive bond between the module, and metal heat sink and the potting material without damaging the components. Electrical power applied to the elements causes breakdown of bonding material.

B68-10087  
SUPERCONDUCTING SWITCH PERMITS MEASUREMENT  
OF SMALL VOLTAGES AT CRYOGENIC TEMPERATURES  
GOVEDNIK, R. E. HUEBENER, R. P. DATE- APR. 1968  
ARG-90260

Dual-coil, superconducting, on-off switch measures small, thermoelectrically generated voltages produced by thermocouples in a liquid helium bath. Placed in a shunt configuration between the thermocouple and the measuring device, the measuring device sees the sum of the voltage to be measured and the spurious thermoelectric voltages.

B68-10088  
NEW CAMERA TUBE IMPROVES ULTRASONIC  
INSPECTION SYSTEM  
BERGER, H. COLLIS, W. J. JACOBS, J. E.  
/NORTHWESTERN UNIV./ DATE- APR. 1968  
ARG-90237

Electron multiplier, incorporated into the camera tube of an ultrasonic imaging system, improves resolution, effectively shields low level circuits, and provides a high level signal input to the television camera. It is effective for inspection of metallic materials for bonds, voids, and homogeneity.

B68-10089  
MONITOR SENSES AMOUNT OF CONTAMINATION  
DEPOSITED ON SURFACES  
SHEEHY, R. N. DATE- MAR. 1968  
GSFC-10212

Monitoring device detects and indicates directly the amount of contamination deposited on a surface. It uses an optical system in conjunction with a reliable collimated light source and associated electronics. Change in its output signal is proportional to change in the optical absorption characteristics of the sample plate surface.

B68-10091  
AUTOMATIC CONTOUR WELDER INCORPORATES  
SPEED CONTROL SYSTEM  
WALL, W. A., JR. DATE- MAR. 1968  
M-FS-14574

Speed control system maintains the welding torch of an automatic welder at a substantially constant speed. The system is particularly useful when welding contoured or unusually shaped surfaces, which cause the distance from the work surface to the weld carriage to vary in a random manner.

B68-10093  
ACCUMULATOR FOR SHAFT ENCODER  
CARROLL, C. C. CHILDS, J. A. ROBISON, R. J.  
/AUBURN UNIV./ DATE- MAR. 1968  
M-FS-13599

Digital accumulator relies almost entirely on integrated circuitry to process the data derived from the outputs of gyro shaft encoder. After the read command is given, the output register collects and stores the data that are on the set output terminals of the up-down counters.

B68-10100  
ALTERNATING CURRENT ELECTROMAGNETIC SERVO  
INDUCTION METER  
BOGUE, R. K. DATE- MAY 1968  
XFR-03838

Electromagnetic device accurately indicates the responses of various sensors in high performance flight research aircraft to conditions encountered in flight. The device responds to sensor inputs to move a slideable armature along an indicator scale by the force of currents induced in the armature winding.

B68-10106  
PORTABLE PULSE CODE MODULATION /PCM/  
SUBSYSTEM  
BRADANINI, P. A. KLUTH, J. T. /N. AM. AVIATION/  
DATE- MAR. 1968  
MSC-11369

Small, programmable, high speed PCM subsystem, supports the variety of signals inherent in sophisticated equipment. A signal generated by a transducer is first conditioned to the proper signal range, then sampled by an external multiplexer or by the subsystem directly and then converted and transmitted to a receiving station.

B68-10112  
PROJECTION TRANSPARENCIES FROM PRINTED  
MATERIAL  
GRUNEWALD, L. S. NICKERSON, T. B. /BOEING CO./  
DATE- APR. 1968  
M-FS-14608

Method for preparing project transparencies, or view graphs, permits the use of almost any expendable printed material, pictures, charts, or text, in unlimited color or black and white. The method can be accomplished by either of two techniques, with a slight difference in materials.

B68-10114  
PIGGY-BACK MOUNTING WOULD INCREASE  
MICROCIRCUIT PACKAGING DENSITY  
GAUDIANO, S. DATE- APR. 1968  
MSC-12059

Piggy-back method of packaging integrated circuits will increase packaging density and design flexibility. It will also eliminate interconnection leads between the die and associated inductances, and thus increase the attainable frequency response of the circuit.

B68-10116  
HIGH EFFICIENCY, HIGH FREQUENCY MAGNETIC  
DEFLECTION DRIVER  
SCHAFF, F. L. /WESTINGHOUSE ELEC. CORP./ DATE-  
APR. 1968  
MSC-11597

Electromagnetic deflection yoke stores energy during the scan and releases it in the flyback or retrace. The operation of the device involves a method of switching to a voltage high enough to dissipate the flyback pulse during the retrace time and then operating during the scan time at a much lower voltage.

# 01 ELECTRICAL (ELECTRONIC)

B68-10118

BILATERAL, ZERO-IMPEDANCE STATIC  
SEMICONDUCTOR SWITCH  
DOUGHMAN, C. L. /WESTINGHOUSE ELEC. CORP./  
DATE- APR. 1968  
LEWIS-10129

Static semiconductor switching circuit eliminates the undesirable features of electromechanical relays and conventional semiconductor switching circuits. There is a net zero voltage drop at the terminals and thus a zero impedance for bilateral currents there.

B68-10121

CIRCUIT ENHANCES VERTICAL RESOLUTION IN  
RASTER SCANNING SYSTEMS  
ALSOVSKY, W. H. GREENWOOD, J. R. HOLLEY, O. M.  
/PHILCO-FORD CORP./ DATE- APR. 1968  
MSC-12123

Circuit enhances vertical resolution in electron beam, raster scanning systems exhibiting aperture distortion in the vertical direction. A sensitized area /image/ produces a video output when the scan beam nears it, which causes vertical elongation in the reconstructed images of all sensitized areas on the surface.

B68-10124

RELIABLE, SELF-CALIBRATING VIBRATION  
TRANSDUCER  
MC KINNEY, R. L. DATE- APR. 1968  
LANGLEY-89

Transducer system measures the uniaxial vibration amplitudes /deflections/ and frequency of a body subjected to mechanical vibration. The basic system is self-calibrating and provides an output which unambiguously indicates the direction as well as the magnitude of the uniaxial deflections.

B68-10129

COMPENSATION CIRCUIT IMPROVES OPERATION OF  
INDUCTIVE COUPLING TRANSFORMERS  
INNOVATOR NOT GIVEN /SPERRY GYROSCOPE CO./  
DATE- APR. 1968  
M-FS-13801

Circuitry eliminates undesirable modulation effects in rotary transformers which transfer electrical energy to and from angular rate transducers on a gyroscope. It cancels the error by feeding back compensation signals through a tertiary winding on the stator of the output rotary transformer.

B68-10130

PHASE-LOCK LOOP FREQUENCY CONTROL AND THE  
DROPOUT PROBLEM  
ATTWOOD, S. KLINE, A. J. /MOTOROLA/ DATE- APR. 1968  
M-FS-13948 M-FS-13950

Technique automatically sets the frequency of narrow band phase-lock loops within automatic lock-in-range. It presets a phase-lock loop to a desired center frequency with a closed loop electronic frequency discriminator and holds the phase-lock loop to that center frequency until lock is achieved.

B68-10131

AUTOMATED PATIENT MONITORING SYSTEM  
BEDARD, R. E. BUXTON, R. L. DAWSON, W. S.  
/BOEING CO./ DATE- MAY 1968 SEE ALSO  
B68-10065  
M-FS-14552

Radio-linked patient monitoring system collects several channels of physiological data from as many as 64 hospital patients and transmits the data in digital form to a central control station. The system consists of a central control station and battery-operated patient units comprising small strap-on electronics packages.

B68-10133

IMPROVED COMPENSATION CIRCUIT FOR  
DIRECT-COUPLED AMPLIFIERS  
BREURER, D. R. /TRW SPACE TECHNOL. LABS./ DATE- APR. 1968  
MSC-11148 MSC-11235

Drift- and offset-control circuit compensates the inherent temperature drift and offset of a

closed-loop feedback amplifier. It overcomes the disadvantages of conventional chopping circuits used to minimize drift in low-level, direct-coupled amplifiers.

B68-10138

ELECTRONIC CALORIMETRIC COMPUTER  
HECKELMAN, J. D. DATE- APR. 1968  
LEWIS-90254

Electronic calorimetric computer calculates nuclear reactor thermal power output to a nominal accuracy of 1 percent. Heat balance is determined by an electronic approach. The thermal power is calculated using the inlet and outlet temperatures and the volume of cooling water and is displayed by a digital readout system.

B68-10140

INSTRUMENTATION FOR BONE DENSITY MEASUREMENT  
MEHARG, L. S. /KAMAN INSTR./ DATE- APR. 1968  
MSC-11388

Measurement system evaluates the integrated bone density over a specific cross section of bone. A digital computer converts stored bone scan data to equivalent aluminum calibration wedge thickness, and bone density is then integrated along the scan by using the trapezoidal approximation integration formula.

B68-10141

STEREO PHOTOMACROGRAPHY SYSTEM  
LINDSEY, W. F. DATE- APR. 1968  
LANGLEY-10176

Stereo photomacrography system provides sharply focused and correctly exposed stereo pairs of photographs through a stereomicroscope. The system uses components of the old system but incorporates a sharp focusing system and includes an improved photometer.

B68-10144

CARDIAC R-WAVE DETECTOR  
GEBBEN, V. D. DATE- APR. 1968 SEE ALSO  
NASA-TM-X-1489  
LEWIS-10394

Cardiac R-wave detector obtains the systolic contraction signal of the human heart and uses it as a reference signal for a heart-assist pump cycle. It processes the natural heart's electrocardiac signal /QRS wave complex/ in a sequence of operations which essentially eliminates all components from the input signal except the R-wave.

B68-10145

HIGH-PRESSURE GAS FACILITATES CALIBRATION OF  
TURBINE FLOWMETERS FOR LIQUID HYDROGEN  
KRAUSE, L. N. SZANISZLO, A. J. DATE- MAY 1968  
SEE ALSO B67-10506 AND NASA-TN-D-3773  
LEWIS-10402

Nitrogen gas at a pressure of 60 atmospheres and ambient temperature facilitates the calibration of turbine flowmeters used for monitoring the flow of liquid hydrogen in cryogenic systems. Full-scale calibration factors can be obtained to an accuracy of 0.4 percent.

B68-10147

DEFLECTION CIRCUIT MONITORS FORCE ON OBJECT  
UNDER WATER  
ROLLER, R. YAROSHUK, N. /WESTINGHOUSE ASTRONUCL. LAB./ DATE- MAY 1968  
NUC-10147

Capsule containing samples for radiation testing is guided under through a seal to an exact position within a nuclear reactor. A Linear Variable Differential Transformer /LVDT/ flexplate deflection circuit monitors the force on the capsule as it is positioned within the reactor.

B68-10148

SILICON SOLAR CELL MONITORS HIGH TEMPERATURE  
FURNACE OPERATION  
ZELLNER, G. J. /WESTINGHOUSE ASTRONUCL. LAB./ DATE- MAY 1968  
NUC-10163

Silicon solar cell, attached to each viewpoint,

monitors that incandescent emission from the hot interior of a furnace without interfering with the test assembly or optical pyrometry during the test. This technique can provide continuous indication of hot spots or provide warning of excessive temperatures in cooler regions.

B68-10149

SYSTEM REMOTELY INSPECTS, MEASURES, AND RECORDS INTERNAL IRREGULARITIES IN PIPING

BERRY, F. H. CUNNINGHAM, J. Y. HEISMAN, R. M. ICELAND, W. F. NORWOOD, L. B. /N. AM. AVIATION/

DATE- MAY 1968

M-FS-14545

Video electromechanical probe visually inspects and measures internal offset and peaking of welds in relatively large piping. Irregularity dimensions are recorded on peripheral equipment consisting of video tape and X-Y plotter. The probe is used for inspection of vacuum-jacketed liquid lines that cannot be inspected externally.

B68-10151

IMPROVED S/N METER

WINDETT, C. B. /MOTOROLA/ DATE- MAY 1968

MSC-11656

Signal-to-noise ratios /S/N/ meter containing a variable-frequency notch filter measures noise plus interference in the presence of carrier or modulation signals. A noise source and calibration signal source are included in the instrument for calibration purposes.

B68-10152

MM-WAVE POWER METER MOUNT

MULLEN, D. L. OLTMANS, D. A. STELZRIED, C. T.

DATE- MAY 1968

NPD-10348

E-band thermistor mount and a technique for adjusting a temperature compensating thermistor to provide an electrically balanced bridge are used for measuring RF power in the mm-wavelength. The mount is relatively insensitive to temperature effects that cause measurement errors in single ended circuits.

B68-10155

HYDRA 1 DATA DISPLAY SYSTEM

HODGKINS, R. L. OSGOOD, D. R. DATE- MAY 1968

MSC-11594

System, named Hydra, generates charts, graphs, and printed matter on slides or conventional negatives and positives, and combines these media with a capability of storage on magnetic tape for future updating to accommodate engineering changes or contract modifications to be readily added to basic data.

B68-10156

PRECISION BOLOMETER BRIDGE

WHITE, D. R. /N. AM. AVIATION/ DATE- MAY 1968

MSC-11473

Prototype precision bolometer calibration bridge is manually balanced device for indicating dc bias and balance with either dc or ac power. An external galvanometer is used with the bridge for null indication, and the circuitry monitors voltage and current simultaneously without adapters in testing 100 and 200 ohm thin film bolometers.

B68-10157

THERMAL RESISTANCES OF SOLDER-BOSS/POTTING COMPOUND COMBINATIONS

VEILLEUX, E. D. /RCA/ DATE- MAY 1968

MSC-12074

Formulas, which can be used as a design tool, are derived to calculate the thermal resistance of solder-boss/potting compound combinations, for different depths of a solder boss, in electronic cordwood modules. Since the solder boss is the heat source, its shape and position will affect the thermal resistance of the surrounding potting compound.

B68-10163

IMPROVED PROCESS FOR MAKING THIN-FILM SODIUM NIOBATE CAPACITORS

MICKA, E. Z. /TRW SPACE TECHNOL. LABS./ DATE-

MAY 1968

MSC-11231

Sodium niobate, formed by high vacuum, flash, and reactive evaporations, has a high dielectric constant and is used as a thin film dielectric in microelectronic capacitors. High purity films are formed from relatively inexpensive, pure starting materials. Crystalline sodium niobate films can be formed on amorphous or crystalline materials.

B68-10166

SILICON SURFACE BARRIER DETECTORS USED FOR LIQUID HYDROGEN DENSITY MEASUREMENT

JAMES, D. T. MILAM, J. K. WINSLETT, H. B. /ORTEC CO./ DATE- JUN. 1968

M-FS-14115

Multichannel system employing a radioisotope radiation source, strontium-90, and a radiation detector, silicon surface barrier detector, measures the local density of liquid hydrogen, at various levels in a storage tank. The instrument contains electronic equipment for collecting the density information, and a data handling system for processing this information.

B68-10171

SILICON OXIDE FILMS GROWN IN MICROWAVE DISCHARGE

KRAITCHMAN, J. /WESTINGHOUSE RES. LABS./ DATE- JUN. 1968

M-FS-14634

Silicon oxide films thicker than 1000 angstrom are produced in the dense plasma of a microwave discharge. The oxide growth is characterized by a rate limiting diffusion process modified by sputtering effects produced by the discharge. Silicon is rapidly oxidized at temperatures estimated to be 500 degrees C or lower.

B68-10173

TUNNEL DIODE CIRCUIT USED AS NANOSECOND-RANGE TIME MARKER

LARSEN, R. N. SHEAR, E. B. DATE- JUN. 1968

ARG-90164

Simple tunnel diode time marker circuit determines the time at which an event occurs in a scintillation crystal. It is capable of triggering at voltages as low as the noise level of a 10-stage PM tube.

B68-10175

CAPACITANCE-COUPLED WIPER INCREASES POTENTIOMETER LIFE

DIMEFF, J. DATE- JUN. 1968 SEE ALSO

NASA-TM-X-1235

ARC-10060

Capacitively-coupled wiper reduces the friction between the sliding contact and the potentiometer element in conventional potentiometers. A small preamplifier employed close to the wiper reduces errors caused by output cable capacitance. The device is friction free with resultant low wear and has high speed and high resolution.

B68-10182

STEADY-STATE DIFFERENTIAL CALORIMETER MEASURES GAMMA HEATING IN REACTOR

HERBST, D. TALBOY, J. H. DATE- JUN. 1968

SEE ALSO ANL-7178

ARG-10120

Steady-state differential calorimeter, which displays good accuracy and reproducibility of results, is used to measure gamma heating in a reactor environment. The calorimeter has a long life expectancy since it is virtually unharmed by the reactor environment.

B68-10183

DETECTION AND LOCATION OF METALLIC OBJECTS IMBEDDED IN NONMETALLIC STRUCTURES

BROWN, R. L. NEUSCHAEFER, R. W. DATE- JUN. 1968

M-FS-14790

Small battery operated eddy current proximity measuring device detects and locates metal objects the size of a dime at distances up to one foot within nonmetallic structures. This device weighs approximately two pounds, occupies approximately 60 cubic inches, and is battery

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powered.

B68-10185  
CONCEPT FOR SLEEVE INDUCTION MOTOR WITH  
1-MSEC MECHANICAL TIME CONSTANT  
WIEGAND, D. E. DATE- JUN. 1968  
ARG-10124

Conductive sleeve induction motor having a 1-msec mechanical time constant is used with solid-state devices to control all-electric servo power systems. The servomotor rotor inertia is small compared to the maximum force rating of the servo motion, permitting high no-load acceleration.

B68-10188  
HIGH- AND LOW-PRESSURE PNEUMOTACHOMETERS  
MEASURE RESPIRATION RATES ACCURATELY IN  
ADVERSE ENVIRONMENTS  
FAGOT, R. J. MC DONALD, R. T. /NORTHROP  
NORTRONICS/ ROMAN, J. A. DATE- JUN. 1968  
SEE ALSO NASA-TN-D-4217  
FRC-10012 FRC-10022

Respiration-rate transducers in the form of pneumotachometers measure respiration rates of pilots operating high performance research aircraft. In each low pressure or high pressure oxygen system a sensor is placed in series with the pilots oxygen supply line to detect gas flow accompanying respiration.

B68-10202  
FAST-RESPONSE CUP ANEMOMETER FEATURES  
COSINE RESPONSE  
FRENZEN, P. DATE- JUN. 1968 SEE ALSO  
ANL-7360  
ARG-90193

Six-cup, low-inertia anemometer combines high resolution and fast response with a unique ability to sense only the horizontal component of the winds fluctuating rapidly in three dimensions. Cup assemblies are fabricated of expanded polystyrene plastic.

B68-10203  
ELECTRONIC LOAD FOR TESTING POWER  
GENERATING DEVICES  
FRIEDMAN, E. B. STEPFER, G. DATE- JUN. 1968  
NPD-10350

Instrument tests various electric power generating devices by connecting the devices to the input of the load and comparing their outputs with a reference voltage. The load automatically adjusts until voltage output of the power generating device matches the reference.

B68-10205  
MULTILAYER PLATED WIRE SHOWS PROMISE AS  
MEMORY DEVICE  
KADISH, D. /MIT/ DATE- JUN. 1968  
MSC-11587

Multilayer plated wire memory system surpasses planar thin film memories because of its high speed, simplicity, and high output. The device consists of 5 mil Be-Cu wire plated with Ni-Fe alloy about 1 micron thick crossed orthogonally by word lines.

B68-10207  
FACSIMILE VIDEO ENHANCEMENT DEVICE  
VERMILLION, C. H. DATE- JUN. 1968  
GSFC-10185

Video remodulation unit enhances facsimile transmission using an amplitude-modulated 2400 Hz carrier. The unit demodulates the signal and then remodulates it, using the same carrier. By using the unit controls, modulation can be set to levels that compensate for picture in-transit degradation.

B68-10210  
ACTIVE RC NETWORKS OF LOW SENSITIVITY FOR  
INTEGRATED CIRCUIT TRANSFER FUNCTION SYNTHESIS  
HUELSMAN, L. P. KERWIN, W. J. NEWCOMB, R. W.  
DATE- JUN. 1968  
ARC-10146

Active RC network is capable of extremely high Q performance with exceptional stability and has independently adjustable zeros and poles. The circuit consists of two integrators and two

summers that are interconnected to produce a complete second-order numerator and a second-order denominator.

B68-10213  
TECHNIQUE INCREASES STORAGE CAPACITY IN  
CAMERA TUBE TARGET  
BOLL, K. F. DE VRIES, H. R. /WESTINGHOUSE ELEC.  
CORP./ DATE- JUN. 1968  
MSC-11599

Technique increases the signal current, where direct beam readout is used, in Secondary Electron Conduction /SEC/ camera tubes. Increasing the storage capacity and therefore the dynamic range of the SEC target permits satisfactory operation at reduced frame rates.

B68-10218  
ZINC-OXYGEN PRIMARY CELL YIELDS HIGH  
ENERGY DENSITY  
GRAFF, C. B. DATE- JUN. 1968  
M-FS-14661

Zinc-oxygen primary cell yields high energy density for battery used as an auxiliary power source in space vehicle systems. Maximum reliability and minimum battery weight is achieved by using a stacking configuration of 23 series-connected modules with 6 parallel-connected cells per module.

B68-10220  
NEW ELECTRICAL PLETHYSMOGRAPH MONITORS  
CARDIAC OUTPUT  
KUBICEK, W. B. PATTERSON, R. P. WITSOE, D. A.  
/MINNESOTA UNIV./ DATE- JUN. 1968  
MSC-11447

Four-electrode impedance plethysmograph measures ventricular stroke volume of cardiac output of humans. The instrument is automatic, operates with only one recording channel, and minimizes patient discomfort.

B68-10223  
LIGHTWEIGHT HEATER GENERATES HIGH  
TEMPERATURES FROM LOW CURRENT  
HANSEN, E. L. DATE- JUL. 1968  
SAN-10004

Double spiral molybdenum heater element uses low current, needs no insulation, and requires support only at the ends, which are also the power input points. Because there is no insulation or internal support necessary, the heater is lightweight. Its temperature potential will vary with its size and environment.

B68-10224  
SEMICONDUCTOR AC STATIC POWER SWITCH  
VRANCIK, J. DATE- JUN. 1968  
LEWIS-10344

Semiconductor ac static power switch has long life and high reliability, contains no moving parts, and operates satisfactorily in severe environments, including high vibration and shock conditions. Due to their resistance to shock and vibration, static switches are used where accidental switching caused by mechanical vibration or shock cannot be tolerated.

B68-10230  
IMPROVED ATOMIC RESONANCE GAS CELL FOR USE  
IN FREQUENCY STANDARDS  
HUGGETT, G. R. /VARIAN ASSOCIATES/ DATE- JUL.  
1968  
MSC-11666

Atomic resonance gas cell maintains a stable operating frequency in the presence of pressure fluctuations in the ambient atmosphere. The new cell includes an envelope which is transparent to radiation in the optical region and to microwave energy at the atomic resonance frequency of the alkali-metal vapor within the envelope.

B68-10233  
ELECTROCARDIOGRAPH TRANSMITTED BY RF AND  
TELEPHONE LINKS IN EMERGENCY SITUATIONS  
CARPENTER, L. R. LEWIS, C. E., JR. MC DONALD, R.  
T. DATE- JUL. 1968  
FRC-10031

Electrocardiograph of an injured human subject is



transmitted by RF and telephone links from the ambulance at the emergency scene, to the hospital emergency facilities. This system eliminates delay in the diagnosis of required therapy, thereby enhancing emergency and rescue operations.

B68-10236

QUASI-STATIC VAPOR PRESSURE MEASUREMENTS  
ON REACTIVE SYSTEMS IN INERT ATMOSPHERE BOX  
FISCHER, A. K. DATE- JUL. 1968  
ARG-90142

Apparatus makes vapor pressure measurements on air-sensitive systems in an inert atmosphere glove box. Once the apparatus is loaded with the sample and all connections made, all measuring operations may be performed outside the box. The apparatus is a single-tube adaptation of the double-tube quasi-static technique.

B68-10238

ASTRONAUT SPACE SUIT COMMUNICATION ANTENNA  
LINDSEY, J. F., III NASON, G. H. DATE- JUL. 1968  
MSC-12101

Astronaut space suit communication antenna consists of a spring steel monopole in a blade-type configuration. This antenna is mounted in a copper cup filled with a potting compound that is recessed in the center to facilitate bending the blade flat for stowing when not in use.

B68-10241

PARALLEL-TO-SERIAL BIPHASE-DATA CONVERTER  
TRUELOVE, R. D. /N. AM. AVIATION/ DATE- JUL. 1968  
MSC-11600

Data converter produces a serial biphase output signal from parallel input data. Alternate bits are loaded into a shift register in complement form so that the bits appear at the end of the shift register in a true-complement form sequence.

B68-10242

WELDER ANALYZER  
MILLER, L. L. /GEN. MOTORS CORP./ DATE- JUL. 1968  
MSC-12068

Welder analyzer circuit evaluates and certifies resistance welding machines. The analyzer measures peak current, peak voltage, peak power, total energy, and first-pulse energy. It is used as an energy monitor while welding is being performed, or a precision shunt load for a pure electrical evaluation of the weld machine.

B68-10244

IMPROVED TRAVELING WAVE MASER AMPLIFIER  
CLAUSS, R. C. DATE- JUL. 1968  
NPO-10548

Traveling Wave Maser /TWM/ that operates at S-band frequencies is characterized by a greatly improved gain-bandwidth product with relatively low equivalent-noise temperature. Tests indicate that its performance exceeds that of any other type of S-band amplifier.

B68-10246

MINIATURE PRESSURE TRANSDUCER FOR STRESSED MEMBER APPLICATION  
WALKER, R. R. WICKHAM, C. G. /N. AM. AVIATION/ DATE- JUL. 1968  
MSC-11869

Miniature pressure transducer responds to static or dynamic pressures acting against a structural surface without introducing errors caused by stresses in the structural surface. This is accomplished by a thin stainless steel pressure sensing diaphragm with an attached foil strain gage.

B68-10254

HARMONIC DISTORTION ANALYZER SPEEDS SETUP OF MAGNETIC TAPE RECORDERS  
TINARI, D. F. DATE- JUL. 1968  
GSFC-10198

Harmonic distortion analyzer effects rapid and accurate setup and calibration of magnetic tape instrumentation recorders. The analyzer is portable, requires no warmup period and need not

be calibrated for normal usage. Average setup time with this analyzer is approximately 30 seconds per track.

B68-10258

ACQUISITION OF PSEUDONOISE SIGNALS BY SEQUENTIAL ESTIMATION  
WARD, R. B. /LOCKHEED MISSILES AND SPACE CO./ DATE- JUL. 1968  
M-FS-13898

Rapid Acquisition by Sequential Estimation /RASE/ system is used in the receivers of tracking and communications systems to bring identical locally generated pseudonoise digital modulation signal into time synchronization with the incoming pseudonoise signal. This acquisition system is particularly suited for medium input signal-to-noise ratios.

B68-10262

SILICON STRAIN SENSORS ENABLE PRESSURE MEASUREMENT AT CRYOGENIC TEMPERATURES  
BOWMAN, R. BURNS, J. MC LELLAN, W. /ELECTRO-OPTICAL SYSTEMS/ DATE- JUL. 1968  
M-FS-14703

Miniature pressure transducers with diffused, heavily doped silicon strain-gage sensor elements, operates over a wide temperature range. Small thermal mass combined with close coupling between a metallic diaphragm and sensor elements minimizes sensitivity to temperature transients.

B68-10263

IMPROVED FUEL-CELL-TYPE HYDROGEN SENSOR  
RUDEK, F. P. RUTKOWSKI, M. D. /GE/ DATE- JUL. 1968  
M-FS-14656

Modified hydrogen sensor replaces oxygen cathode with a cathode consisting of a sealed paste of gold hydroxide and a pure gold current collector. The net reaction which occurs during cell operation is the reduction of the gold hydroxide to gold and water, with a half-cell potential of 1.4 volts.

B68-10264

CONCEPTUAL DEAD WEIGHT DEVICE TO PROVIDE PRESSURE CALIBRATION  
KARCHER, G. OLSON, G. /CHRYSLER CORP./ DATE- JUL. 1968  
M-FS-14672

Dead weight testing device uses a common force plane piston manometer to set accurate gage pressure in pounds per square inch. An additional piston gage easily adapts the device for absolute pressure calibration.

B68-10267

MOEBIUS RESISTOR IS NONINDUCTIVE AND NONREACTIVE  
DAVIS, R. L. DATE- JUL. 1968  
SAN-10020

Moebius strip made of insulated resistive materials with electrical leads attached directly opposite one another provides a noninductive, nonreactive resistor which is simple, inexpensive, and flexible in usage, and can be made to almost any desired size and shape.

B68-10268

VIBRATION TESTING AND DYNAMIC STUDIES OF RELAYS  
INNOVATOR NOT GIVEN /OKLAHOMA STATE UNIV./ DATE- JUL. 1968  
M-FS-14542

Study has been undertaken to determine the separation criteria for a preloaded, idealized set of contacts when they are subjected to a steady-state sinusoidal excitation and when the elasticity of one contact is nonlinear. The study consists of two phases, theoretical and experimental.

B68-10269

LOW ENERGY OHMMETER CAN BE USED TO TEST SENSITIVE CIRCUITS, OTHER METERS  
PLATT, L. W. DATE- JUL. 1968  
SAN-10013

Hazardous circuit ohmmeter is of sufficiently low

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energy output that it may be used to test extremely sensitive circuits safely, reliably, and accurately. A polyurethane-foam-lined aluminum case provided protection for the unit assembly.

B68-10272

## NOISE FIGURE MEASUREMENT CONCEPT FOR ACOUSTIC AMPLIFIERS

JOHNSON, V. R. YEAGER, J. R. /MICROWAVE ELECTRON./ DATE- JUL. 1968  
GSFC-10066

Optimum length buffer crystals are used with an amplification section for measuring the noise figure for acoustic amplifiers. Measuring the time required to saturate with noise a signal, which is reflected back and forth in the circuit, gives a direct measurement of the amplifiers noise figure.

B68-10273

## RECHARGE UNIT PROVIDES FOR OPTIMUM RECHARGING OF BATTERY CELLS

BAER, D. FORD, F. E. DATE- AUG. 1968  
GSFC-10688

Percent recharge unit permits each cell of a rechargeable battery to be charged to a preset capacity of the cell. The unit automatically monitors and controls a rechargeable battery subjected to charge-discharge cycling tests.

B68-10280

## IGNITION OF BINARY ALLOYS OF URANIUM

BAKER, L., JR. BINGLE, J. D. SCHNIZLEIN, J. G. DATE- AUG. 1968  
ARG-10057

Experiments determine the effect of alloying additives on the ignition of uranium. Data on oxidation rates, ignition temperatures, and burning curves are provided in the report.

B68-10283

## HIGH-VOLTAGE PULSE GENERATOR DEVELOPED FOR WIDE-GAP SPARK CHAMBERS

KELLER, L. P. WALSHON, E. G. DATE- AUG. 1968  
ARG-10136

Low-inductance, high-capacitance Marx pulse generator provides for minimization of internal inductance and suppression of external electromagnetic radiation. The spark gaps of the generator are enclosed in a pressurized nitrogen atmosphere which allows the charging voltage to be varied by changing the nitrogen pressure.

B68-10289

## DEEP SPACE FM SYSTEM, A CONCEPT

DOLAND, G. D. /LOCKHEED ELECTRON. CO./ DATE- AUG. 1968  
MSC-11825

Deep space frequency modulation system permits transmission of data where the signal deviation is greater than 1/2 the predetection bandwidth. It provides satisfactory performance at great distances or with low signal levels..

B68-10290

## DYNAMIC LINEARITY MEASUREMENT TECHNIQUE

MERZ, K. MORRELL, L. /BOEING CO./ DATE- AUG. 1968  
KSC-10186

Measurement technique involves frequency modulated discriminator which produces an error signal as two signals, one of known and one of unknown frequency. The signals are electronically switched to a discriminator input, allowing independent measuring of dynamic linearity in a frequency modulated subcarrier oscillator.

B68-10291

## CRYOGENIC LIQUID LEVEL MEASURING PROBE

DINKEL, J. A. WEGNER, C. R. DATE- AUG. 1968  
ARG-10138

Universal probe, which contains a unique frequency discriminator, measures the static and dynamic levels of cryogenic liquids in a hydrogen bubble chamber. The probe allows boiling conditions or other turbulence to be observed throughout all the transition stages.

B68-10301

## RANDOM ACCESS-RANDOM RELEASE RELAY SWITCHING MATRIX

CARTER, J. A. EVANS, F. E. /N. AM. ROCKWELL CORP./ DATE- AUG. 1968  
M-FS-12590

XY relay switching matrix provides complete random access and random release of 400 points. A mercury-wetted bistable relay with independent set and reset coils is the unique feature associated with each point.

B68-10303

## CONCEPTUAL APPARATUS FOR DETECTING LEAKS OF NONCONDUCTIVE LIQUIDS

WALSH, G. D. /BOEING CO./ DATE- AUG. 1968  
M-FS-14713

Apparatus detects leaks at joints in lines carrying electrically nonconductive liquids. The proposed apparatus could include a panel that would give a visual or audible indication of a leak /to permit manual shutdown/ and/or an electromechanical actuator that would automatically cut off the flow when a leak occurs.

B68-10305

## CURRENT-LIMITING VOLTAGE REGULATOR

CLEVELAND, E. F. DATE- AUG. 1968  
MSC-11824

Voltage regulator, which operates within preset current limits, acts as a circuit breaker to prevent overload failure, and automatically resets when the overload is removed. The power dissipated in the series transistor of the circuit is constant from normal load to short circuit condition.

B68-10306

## COMMUNICATION SYSTEM FEATURES DUAL MODE RANGE ACQUISITION PLUS TIME DELAY MEASUREMENT

ATWOOD, S. W. KLINE, A. W., JR. WELTER, N. E. /MOTOROLA/ DATE- AUG. 1968  
M-FS-14323 M-FS-14324

Communication system combines range acquisition system and time measurement system for tracking high velocity aircraft and spacecraft. The range acquisition system uses a pseudonoise code to determine range and the time measurement system reduces uncontrolled phase variations in the demodulated signal.

B68-10307

## ENCAPSULATION TECHNIQUE ELIMINATES THERMAL STRESSES IN WELDED ELECTRONIC MODULES

KIMMEL, M. /N. AM. ROCKWELL CORP./ DATE- AUG. 1968 SEE ALSO B67-10367  
M-FS-14581

Encapsulation technique minimizes embedment and thermal stresses in welded electronic modules. A coating of thinned room-temperature- vulcanizing silicone rubber having a high coefficient of expansion and flexibility at low temperature, is applied first and then an encapsulating epoxy resin having a relatively low coefficient of expansion is added.

B68-10308

## SOLID STATE HIGH-VOLTAGE PULSER OPERATES WITH LOW SUPPLY VOLTAGE

MILBERGER, W. E. /WESTINGHOUSE ELEC. CORP./ DATE- AUG. 1968  
M-FS-14034

High speed klystron cathode pulser requires low voltage to generate high-voltage pulses. Broadband video transformers are wound in two configurations - /1/ transmission line, multifilar toroids and /2/ loop coupling toroids. The circuit adapts to generate high-speed, high-voltage, high-stability power pulses at megawatt levels.

B68-10309

## FEASIBILITY STUDY OF WIRELESS POWER TRANSMISSION SYSTEMS

ROBINSON, W. J., JR. DATE- AUG. 1968  
M-FS-14691

Wireless microwave or laser energy transfers power from a manned Earth-orbiting central station to

unmanned astronomical substations. More efficient systems are required for the microwave power transmission.

**B68-10310**  
STANDARDS FOR COMPATIBILITY OF PRINTED  
CIRCUIT AND COMPONENT LEAD MATERIALS  
INNOVATOR NOT GIVEN /MARTIN CO./ DATE- AUG.  
1968

**M-FS-14531**  
Study of packaging of microminiature electronic components reveals methods of improving compatibility of lead materials, joining techniques, transfer molding concepts, printed circuit board materials, and process and material specifications.

**B68-10311**  
IMPROVED ELECTRO-OPTICAL TRACKING SYSTEM  
JOHNSON, R. E. WEISS, P. F. /SYLVANIA ELECTRON.  
SYSTEMS/ DATE- AUG. 1968  
**M-FS-14791**

Electro-optical tracking system employs a laser beam illuminating source, an electronic laser beam deflector, and an image dissector photomultiplier. An electronic scanning transmitter and receiver follows rapid movements or accelerations of the target.

**B68-10312**  
SYSTEM MEASURES ARC ENERGY DISSIPATED IN  
RELAY CONTACT CYCLING  
INNOVATOR NOT GIVEN /OKLAHOMA ST. UNIV./  
DATE- AUG. 1968  
**M-FS-14541**

System, containing cycle timer, measures the energy dissipated at the contacts of a relay operating in an electric circuit. The system measures as well as records the energy for a large number of repetitive operations.

**B68-10313**  
ANALYSIS AND DESIGN OF A CLASS-D AMPLIFIER  
INNOVATOR NOT GIVEN /AUBURN UNIV./ DATE-  
AUG. 1968  
**M-FS-14803**

Analysis of a basic class-D amplifier circuit configuration shows its adaptability to a variety of applications. The feedback, input and output configuration and the frequency spectrum of the pulse-width-modulated signal are analyzed.

**B68-10314**  
COLOR-TELEVISED MEDICAL MICROSCOPY  
HEATH, M. A. PECK, J. C. DATE- AUG. 1968  
**MSC-13086**

Color-television microscopy used at laboratory-range magnifications, reproduces a slide image with sufficient fidelity for medical laboratory and instructional use. The system is used for instant pathological reporting between operating room and remotely located pathologist viewing a biopsy through this medium.

**B68-10315**  
GIMBAL ANGLE SENSOR  
ZAREMBA, J. G. /TRW SYSTEMS GROUP/ DATE- AUG.  
1968  
**GSFC-10305**

Detector flake located parallel to a slotted mask mechanical differentiator, senses the rotation of a gimbalized reaction wheel mounting. As the gimbal moves light passes through the mask and strikes a section of the detector, the electrical output of which has been calibrated in terms of degrees of rotation.

**B68-10316**  
OPTIMETRIC SYSTEM FACILITATES COLORIMETRIC  
AND FLUOROMETRIC MEASUREMENTS  
HALEY, F. C. DATE- AUG. 1968  
**NPO-10233**

Compact, unitary optimetric systems uses a single device for colorimetric, fluorometric and spectral absorption measurements. The basic element of the unitary systems is a test cell containing filter elements with uniquely fabricated lenses.

**B68-10317**  
METHOD OF REDUCING TIME BASE ERROR IN  
DIGITAL MAGNETIC RECORDERS  
MOORE, J. M. /ELECTRO-MECHAN. RES./ DATE- AUG.  
1968  
**GSFC-10108**

Apparatus reduces Time Base Error /TBE/ in the playback of digital data from magnetic recording equipment. The apparatus uses a magnet which employs a servo position control of the tape by which the playback data clock is phase locked with a fixed frequency reference signal.

**B68-10319**  
ULTRASONIC TEMPERATURE MEASURING DEVICE  
CARNEVALE, E. H. LYNNWORTH, L. C. /PARAMETRICS/  
DATE- AUG. 1968  
**LEWIS-10446**

Pulse echo ultrasonic system automatically determines the temperature in the core of a nuclear rocket engine by measuring the transit time of an acoustic pulse in a wire sensor. The measurement is based on the fact that the speed of sound in the sensor material is a function of temperature.

**B68-10321**  
CONCEPT TO CONVERT ELECTRICAL POWER  
RATTI, N. /LEAR SIEGLER/ DATE- AUG. 1968  
**GSFC-10222**

Moving fluid conductor transforms electrical power from one voltage to another. The electrically conductive fluid acts as a coupling medium between or among multiple electromagnetic fields producing the conversion.

**B68-10323**  
HYDROGEN SAFETY MANUAL  
DATE- AUG. 1968 SEE ALSO NASA-SP-5032 AND  
NASA-TM-X-52454  
**LEWIS-10487**

Hydrogen safety manual covers the characteristics and nature of hydrogen, design principles for hydrogen systems, protection of personnel and equipment, and operating and emergency procedures. It sets standards and practices for minimum safety requirements at hydrogen installations.

**B68-10325**  
ELECTROCHEMICAL CELL HAS INTERNAL RESISTIVE  
HEATER ELEMENT  
COLSTON, E. F. FORD, F. E. HENNIGAN, T. J.  
DATE- AUG. 1968  
**GSFC-10358**

External source supplies power to electrochemical cells containing internal resistive heater element. Each cell plate is individually contained in its own Pellon bag, enabling the heater element to be arranged in a continuous, parallel circuit.

**B68-10327**  
POWER CONSUMPTION IN ACOUSTIC AMPLIFIERS  
UNDER CONDITIONS OF MAXIMUM STABLE GAIN  
JOHNSON, V. R. /MICROWAVE ELECTRON./ DATE- AUG.  
1968  
**GSFC-10067**

Comparison is made of the power consumed and the acoustic amplification realized when a dc bias field is placed across a piezoelectric semiconductor and adjusted to amplify a microwave acoustic signal to the point where the forward gain is just equal to the reverse attenuation. This represents the maximum possible gain condition.

**B68-10328**  
TRANSISTORIZED MARX BANK PULSE CIRCUIT  
PROVIDES VOLTAGE MULTIPLICATION WITH  
NANOSECOND RISE-TIME  
JUNG, E. A. LEWIS, R. N. DATE- AUG. 1968  
**ARG-10110**

Base-triggered avalanche transistor circuit used in a Marx bank pulser configuration provides voltage multiplication with nanosecond rise-time. The avalanche-mode transistors replace conventional spark gaps in the Marx bank. The delay time from an input signal to the output signal to the output is typically 6 nanoseconds.

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SIMULTANEOUS MESSAGE FRAMING AND ERROR  
DETECTION

FREY, A. H., JR. /IBM/ DATE- SEP. 1968  
MSC-12001

Circuitry simultaneously inserts message framing information and detects noise errors in binary code data transmissions. Separate message groups are framed without requiring both framing bits and error-checking bits, and predetermined message sequence are separated from other message sequences without being hampered by intervening noise.

B68-10333

AUTOMATIC, NONDESTRUCTIVE TEST MONITORS  
IN-PROCESS WELD QUALITY

DEAL, F. C. /MARTIN CO./ DATE- SEP. 1968  
M-FS-14996

Instrument automatically and nondestructively monitors the quality of welds produced in microresistance welding. It measures the infrared energy generated in the weld as the weld is made and compares this energy with maximum and minimum limits of infrared energy values previously correlated with acceptable weld-strength tolerances.

B68-10336

FULLY AUTOMATIC TELEMETRY DATA PROCESSOR

COX, F. B. /BECKMAN INSTR. CO./ KEIPERT, F. A.  
LEE, R. C. DATE- SEP 1968 SEE ALSO

NASA-TN-D-3981

GSFC-10576

Satellite Telemetry Automatic Reduction System /STARS 2/, a fully automatic computer-controlled telemetry data processor, maximizes data recovery, reduces turnaround time, increases flexibility, and improves operational efficiency. The system incorporates a CDC 3200 computer as its central element.

B68-10337

TEMPERATURE OR PRESSURE CONTROLLER

GILLET, J. D. /N. AM. ROCKWELL CORP./ DATE-  
SEP. 1968

LEWIS-10297

Silicon chip thermal sensor coupled into a solid state power source controls temperature or pressure in combustion research. The silicon chip sensing element is embedded in a ceramic support for insulation, and connected to a high resistance bridge which operates the solid state power amplifiers.

B68-10341

SUPERCONDUCTIVE THIN FILM MAKES CONVENIENT

LIQUID HELIUM LEVEL SENSOR

BECKER, H. H. DATE- SEP. 1968

LANGLEY-10289

Sensor consisting of superconductive film mounted on a dipstick measures the level of liquid helium in a Dewar flask. The sensor is made by depositing a thin film of niobium metal to a thickness of 2000 angstroms on a quartz substrate, which is then mounted on a graduated dipstick.

B68-10342

INDIUM ADHESION PROVIDES QUANTITATIVE

MEASURE OF SURFACE CLEANLINESS

KRIEGER, G. L. WILSON, G. J. DATE- SEP. 1968

SAN-10024

Indium tipped probe measures hydrophobic and hydrophilic contaminants on rough and smooth surfaces. The force needed to pull the indium tip, which adheres to a clean surface, away from the surface provides a quantitative measure of cleanliness.

B68-10350

FLUIDIC-THERMOCHROMIC DISPLAY DEVICE

GRAFSTEIN, D. HILBORN, E. H. DATE- SEP. 1968

SEE ALSO NASA-CR-80016 AND NASA-CR-86031

ERC-10031

Fluidic decoder and display device has low-power requirements for temperature control of thermochromic materials. An electro-to-fluid converter translates incoming electrical signals into pneumatics signal of sufficient power to

operate the fluidic logic elements.

B68-10357

CLOSED CIRCUIT TV SYSTEM AUTOMATICALLY

GUIDES WELDING ARC

STEPHANS, D. L. /HAYES INTERN. CORP./ WALL, W.

A., JR. DATE- SEP. 1968

M-FS-20084

Closed circuit television /CCTV/ system automatically guides a welding torch to position the welding arc accurately along weld seams. Digital counting and logic techniques incorporated in the control circuitry, ensure performance reliability.

B68-10362

RATING OF ELECTRICAL WIRES IN VACUUM

ENVIRONMENTS

SCHAEFER, J. L. SVENSON, F. C. /N. AM. ROCKWELL

CORP./ DATE- OCT. 1968

MSC-15108

Electric conductors used in vacuum environments have smaller cross sections. This report provides data on the correct size wire for a required current load in free-air, low-pressure oxygen, and vacuum environments.

B68-10364

NONDESTRUCTIVE TEST DETERMINES OVERLOAD

DESTRUCTION CHARACTERISTICS OF CURRENT

LIMITER FUSES

SWARTZ, G. A. /ELECTRA-MIDLAND CORP./ DATE- OCT.

1968

XGS-08566

Nondestructive test predicts the time required for current limiters to blow /open the circuit/ when subjected to a given overload. The test method is based on an empirical relationship between the voltage rise across a current limiter for a fixed time interval and the time to blow.

B68-10365

AUTOMATIC PATIENT RESPIRATION FAILURE

DETECTION SYSTEM WITH WIRELESS TRANSMISSION

DIMEFF, J. POPE, J. M. DATE- OCT. 1968

ARC-10174

Automatic respiration failure detection system detects respiration failure in patients with a surgically implanted tracheostomy tube, and actuates an audible and/or visual alarm. The system incorporates a miniature radio transmitter so that the patient is unencumbered by wires yet can be monitored from a remote location.

B68-10367

DETECTION OF EFFECT OF DEPOSITS ON OPTICAL

WINDOWS OF PYROMETER MEASUREMENTS

CIPOLONE, P. DATE- OCT. 1968

LEWIS-10366

Temperatures measurements in an enclosed test chamber are more accurate when the reflectivity of the inner coated surface is compared to the outer clean surface of an optical window. Temperature readings are corrected by correlating the reflectivity of the deposits with their effect on the temperature measurement.

B68-10370

COOLED MINIATURE PRESSURE TRANSDUCERS

EFFECTIVE AT HIGH TEMPERATURES

ARMENTROUT, E. C. DATE- OCT. 1968

LEWIS-10401

Miniature pressure transducers in compact water-cooled mounts are placed in hotter and more confined environments than previously possible. It quantitatively measures high frequency total pressure fluctuations resulting from rotating stall in an axial flow engine compressor.

B68-10379

AUTOMATIC SYSTEM NONDESTRUCTIVELY MONITORS

AND RECORDS FATIGUE CRACK GROWTH

HOPPE, F. INMAN, N. S. /FAIRCHILD HILLER CORP./

DATE- OCT. 1968

LANGLEY-10091

Ultrasonic reflection system automatically and nondestructively detects and records the propagation of fatigue cracks in test specimens undergoing fatigue cycling. A reflector plate

obtains a reference signal and monitors the location of the tip of a propagating fatigue crack.

**B68-10382**  
SYSTEM MEASURES RESPONSE TIME OF  
PHOTOMULTIPLIER TUBES  
LAUVER, M. R. DATE- OCT. 1968  
LEWIS-10437

Calibration system enables precise determination of rise time of photosensitive detectors. To perform a calibration, the time-voltage curve of the excitation voltage for a light source is compared with the time-voltage curve of the voltage output from a photosensitive detector which is responding to the light.

**B68-10384**  
IMPROVED LIMITER FOR TURN-ON CURRENT  
TRANSIENT  
HALLBERG, F. C. DATE- OCT. 1968  
GSFC-10413

Circuit limits the turn-on current transient to a specified amplitude and provides a low-impedance path between supply voltage and load after a prescribed time interval. The circuit offers a wide range of flexibility in adjusting peak current and automatic control of the initial peak current.

**B68-10386**  
LOW-COST, FAST-RESPONSE DRIVE CIRCUIT FOR  
ELECTROMAGNETIC TORQUE MOTORS  
ZELLER, J. R. DATE- OCT. 1968  
LEWIS-10143

Fast-response coil drive circuit, for electromagnetic torque motors, reduces the inductive coil time constant with a minimum of circuit sophistication. The low-cost modulator servoamplifier is used with a compatible preamplifier stage which provides the servo-loop function of summing, adjustable gain and compensation

**B68-10388**  
METHOD FOR REDUCING SNAP IN MAGNETIC  
AMPLIFIERS  
FISCHER, R. L. E. WORD, J. L. DATE- OCT. 1968  
LEWIS-10388

Method of reducing snap in magnetic amplifiers uses a degenerative feedback circuit consisting of a resistor and a separate winding on a magnetic core. The feedback circuit extends amplifier range by allowing it to be used at lower values of output current.

**B68-10389**  
METHOD FOR MAKING SMALL POINTED  
THERMOCOUPLES  
STOVER, C. M. DATE- OCT. 1968  
SAN-10014

Constantan wire worked to a needle point and covered with a copper coating produces a small, concentric, fast-reaction thermocouple that has the fast response time necessary to measure rapid temperature changes accurately and only slightly alters the environment being measured.

**B68-10397**  
CHARTS DESIGNATE PROBABLE FUTURE  
OCEANOGRAPHIC RESEARCH FIELDS  
INNOVATOR NOT GIVEN /MCDONNELL DOUGLAS CO./  
DATE- OCT. 1968  
M-FS-20202

Charts outline the questions and problems of oceanographic research in the future. NASA uses the charts to estimate the probable requirements for instrumentation carried by satellites engaged in cooperative programs with other agencies concerned with identification, analysis, and solution of many of these problems.

**B68-10399**  
AUTOMATIC SOLAR LAMP INTENSITY CONTROL  
SYSTEM  
LEVERONE, H. MANDELL, N. DATE- NOV. 1968  
XGS-10017

System that substitutes solar cells directly in the path of the radiation incident on the test

volume and uses a dc bridge-null system was developed. The solar cell is affixed to a heat sink mounted on each of three arms for each solar lamp. Control of the radiation from the solar lamps is automatic.

**B68-10400**  
LITHIUM-TELLURIUM BIMETALLIC CELL HAS  
INCREASED VOLTAGE  
CAIRNS, E. J. ROGERS, G. L. SHIMOTAKE, H. DATE-  
NOV. 1968  
ARG-10141

Lithium-tellurium secondary cell with a fused lithium halide electrolyte, tested in the temperature range 467 degrees to 500 degrees C, showed improvement over the sodium bismuth cell. The voltage of this bimetallic cell was increased by using the more electropositive anode material, lithium, and the more electronegative cathode material, tellurium.

**B68-10402**  
SYSTEM FOR MEASURING SPATIAL DISTRIBUTION OF  
EJECTED DROPLETS, A CONCEPT  
AYVAZIAN, R. A. /N. AM. ROCKWELL CORP./ DATE-  
NOV. 1968  
NPO-10185

System measures the spatial distribution of high-velocity droplets ejected from a nozzle or spray gun. The system employs an electrically resistive grid as the sensing screen, electrical leads, and a signal scanner such as a cathode ray tube.

**B68-10404**  
DESIGN CONCEPT FOR NONARCING ELECTRICAL  
CONNECTOR  
HOLMEN, R. E. /DOUGLAS AIRCRAFT CO./ DATE- NOV.  
1968  
M-FS-14937

Connector plug automatically minimizes arcing during mating and demating. This plug uses a high-resistivity outer sheath as an extension to the regular pin contact. It is used in atmospheres containing explosive gases, and reduces erosion at the contact surfaces where mating and demating are performed frequently.

**B68-10411**  
INVERTED GROUNDING TECHNIQUE FOR ELECTRON  
BEAM HEATING  
JIRBERG, R. J. DATE- DEC. 1968  
LEWIS-10543

In the production of high temperatures by electron bombardment the cathode is held at ground potential while the hot anode is raised to a high negative potential. An annealing chamber using the inverted grounding is constructed around a commercially available stainless steel \*\*cross.\*\*

**B68-10412**  
AUTOMATIC CALIBRATION SYSTEM FOR PRESSURE  
TRANSDUCERS  
INNOVATOR NOT GIVEN /G. T. SCHJELDAHL CO./  
DATE- DEC. 1968  
M-FS-20127

Fifty-channel automatic pressure transducer calibration system increases quantity and accuracy for test evaluation calibration. The pressure transducers are installed in an environmental tests chamber and manifolded to connect them to a pressure balance which is uniform.

**B68-10413**  
UV DETECTOR MONITORS ORGANIC CONTAMINATION  
OF OPTICAL SURFACES  
GLENN, C. G. KENNEDY, B. W. DATE- DEC. 1968  
M-FS-20246

Silicon carbide, insensitive to visible light, is used in photodetectors. System contamination can be monitored during the normal operation without interference to the operator, and without shielding from ambient light.

**B68-10415**  
NEW BIMETALLIC EMF CELL SHOWS PROMISE IN  
DIRECT ENERGY CONVERSION  
HESSON, J. C. SHIMOTAKE, H. DATE- NOV. 1968  
ARG-10183

# 01 ELECTRICAL (ELECTRONIC)

Concentration cell, based upon a thermally regenerative cell principle, produces electrical energy from any large heat source. This experimental bimetallic EMF cell uses a sodium-bismuth alloy cathode and a pure liquid sodium anode. The cell exhibits reliability, corrosion resistance, and high current density performance.

B68-10420

HIGH RESOLUTION GE /LI/ SPECTROMETER  
REDUCES RATE-DEPENDENT DISTORTIONS AT HIGH COUNTING RATES

BRENNER, R. LARSEN, R. N. MANN, H. M. RUDNICK,  
S. J. SHERMAN, I. S. STRAUSS, M. G. DATE- NOV. 1968

ARG-10144

Modified spectrometer system with a low-noise preamplifier reduces rate-dependent distortions at high counting rates, 25,000 counts per second. Pole-zero cancellation minimizes pulse undershoots due to multiple time constants, baseline restoration improves resolution and prevents spectral shifts.

B68-10428

DESIGN CONCEPT FOR A RAPID AUTOMATIC SYNC ACQUISITION SYSTEM

ANDERSON, T. O. GAILO, A. J. DATE- NOV. 1968  
NPD-10214

System intends to provide rapid command sync acquisition between widely separated transmitter-receivers, such as a spacecraft telemetry transmitter and a ground-based receiver. The system facilitates rapid sync acquisition between stations and regains data lock after interruption or equipment failure.

B68-10429

CONDITIONING FLAT CONDUCTORS FOR FLAT CONDUCTOR CABLE PRODUCTION  
INNOVATOR NOT GIVEN /VITRO CORP. OF AMER./  
DATE- DEC. 1968

M-FS-14914

Apparatus can straighten, anneal, clean, and apply a tension to stretch a cable one percent to assure uniform cross-sectional area. A conductor passes through temperature controlled distilled water and through a toroid coil. As the conductor enters the water, steam performs the cleaning action. Quenching and annealing also take place.

B68-10430

SYSTEM CONVERTS OPTICAL PHASE CHANGES TO RF PHASE CHANGES

LOGUE, S. S. /GEN. DYN./CONVAIR/ DATE- NOV. 1968  
M-FS-20091

System converts phase changes at optical frequencies to equal phase changes at RF. This system operates in conjunction with either a Michelson interferometer or conventional interferometers.

B68-10431

CHARGE CONTROL OF NICKEL-CADMIUM BATTERIES BY COULOMETER AND THIRD ELECTRODE METHOD  
FORD, F. PAULKOVITCH, J. DATE- SEP. 1968  
GSFC-10487

Combined coulometer/third electrode control circuit for a nickel-cadmium battery included at least one cell of the third electrode type is illustrated. The coulometer/third electrode sensing circuit controls the series regulator as necessary to maintain the sensing voltage at the preset sensing level.

B68-10432

HIGH-EFFICIENCY STEP-UP REGULATOR  
LISTER, L. R. /SPERRY RAND CORP./ DATE- DEC. 1968

M-FS-20049

Single-ended step-up regulator-chopper power supply /employing conventional chopper circuitry/ combines the advantages of the chopper and switching regulator circuits. Schematic of the power supply incorporating the step-up regulator is shown.

B68-10434

SELECTIVE VIDEO BLANKING TECHNIQUE  
SABOE, M. M. TREUDE, R. C. /WESTINGHOUSE ELEC. CORP./ DATE- DEC. 1968

M-FS-20013

Adverse viewing effects caused by faulty photosensitive elements are eliminated. A linear maximal /or nonmaximal/ sequence generator gives a pseudorandom pulse train to selectively blank the display monitor during specified mosaic interrogation times. The outputs minimize the length of the required shift register generator.

B68-10436

COMPACT ROTATING CUP ANEMOMETER  
WELLMAN, J. B. DATE- DEC. 1968

NPD-10563

Compact, collapsible rotating cup anemometer is used in remote locations where portability and durability are factors in the choice of equipment. This lightweight instrument has a low wind-velocity threshold, is capable of withstanding large mechanical shocks while in its stowed configuration, and has fast response to wind fluctuations.

B68-10437

TWO-WAY DIGITAL DRIVER/RECEIVER USES ONE SET OF LINES

BURNETT, G. J. PFEIFER, A. F. /N. AM. ROCKWELL CORP./ DATE- OCT. 1968  
ERC-10055

Two-way /bilateral/ digital driver/receiver system using MOS circuits was designed for a multiprocess computer having several subsystems at relatively close locations. The system requires only a single set of communication lines between subsystems, thus achieving lower cost with increased reliability.

B68-10438

NOSEPIECE RESPIRATION MONITOR  
LAVERY, A. L. LONG, L. E. RICE, N. E. DATE- SEP. 1968

ERC-10136

Comfortable, inexpensive nosepiece respiration monitor produces rapid response signals to most conventional high impedance medical signal conditioners. The monitor measures respiration in a manner that produces a large signal with minimum delay.

B68-10443

SHORT CIRCUIT PROTECTION FOR A POWER DISTRIBUTION SYSTEM

OWEN, J. R., III /IBM/ DATE- JAN. 1969  
M-FS-14993

Sensing circuit detects when the output from a matrix is present and when it should be present. The circuit provides short circuit protection for a power distribution system where the selection of the driven load is accomplished by digital logic.

B68-10456

AMPLIFIER IMPROVEMENT CIRCUIT  
STURMAN, J. DATE- DEC. 1968  
LEWIS-10712

Stable input stage was designed for the use with a integrated circuit operational amplifier to provide improved performance as an instrumentation-type amplifier. The circuit provides high input impedance, stable gain, good common mode rejection, very low drift, and low output impedance.

B68-10501

READOUT SYSTEM FOR RADIATION DETECTOR  
BAKER, B. R. CASHION, K. D. DATE- NOV. 1968  
MSC-90180

Improved electrical circuit determines the amount of light detected by a photomultiplier tube when its output signal is in the dark-current range of the tube. The low-intensity light to which the tube responds arises from a thermo-luminescent ionized dosimeter.

B68-10502

RAPID-RESPONSE, LIGHT-EXPOSURE CONTROL SYSTEM

KUEHL, D. K. ZWILLENBERG, M. L. /UNITED AIRCRAFT  
CORP./ DATE- DEC. 1968  
NPO-10238

Rapid-response electro-optical, light exposure control system, will maintain the light reaching a camera film or other light-sensitive detector at essentially constant level, despite wide variations in the brightness of the light source. The system permits detailed photographic or photoelectric recording of the phenomenon over a range of brightnesses.

B68-10505  
LONG-TERM DATA STORAGE AND RETRIEVAL  
SYSTEM, A CONCEPT  
FOX, T. I. /BOEING CO./ DATE- NOV. 1968  
M-FS-14789

Combination magnetic tape/microfilm system may give reliable long-term storage and immediate retrieval. The recording, storage, and retrieval of data would be accomplished by computers, without manual intervention. The proposed system retrieves data in less than one hour after being stored for periods of up to 50 years.

B68-10511  
ROCKET ENGINE ANALOG SIMULATION  
PHILYAW, B. K. RANDAZZO, G. J. /BOEING CO./  
DATE- NOV. 1968  
M-FS-14511

Mathematical equations simulate the operation of a rocket engine, simulate destructive and nondestructive tests to verify engine design feasibility, and investigate nonlinear variations in engine performance.

B68-10513  
METHOD FOR MEASURING ALTERNATOR VOLTAGE  
TRANSIENTS  
PERZ, D. A. DATE- NOV. 1968  
LEWIS-10373

Transient voltage detection circuit measures voltage excursions and recovery times resulting from step-load changes applied to a combination alternator-voltage regulator.

B68-10514  
AUTOMATIC CALIBRATION APPARATUS FOR  
TELEMETRY SYSTEMS  
ALLEN, W. W. DATE- NOV. 1968  
NPO-10560 NPO-10754

Apparatus automatically calibrates and tests spacecraft telemetry systems. The apparatus can generally be used to calibrate analog-to-digital converters.

B68-10516  
HIGH-TEMPERATURE THERMIONIC EMISSION  
MICROSCOPE  
CAMPBELL, A. E., JR. HAMERDINGER, R. W.  
/ELECTRO-OPT. SYSTEMS/ DATE- NOV. 1968  
NPO-10584

Thermionic emission microscope was designed to operate with metal specimen cathode temperatures of 2000 degrees C.

B68-10518  
INTEGRATED METAL TRANSISTOR LEADS  
CARLEY, D. R. CASTERLINE, E. T. /RCA/ DATE-  
JUL. 1968  
GSFC-90536

Technique that makes the metal leads integral to the transistor wafer and reduces capacitance in the device, thereby increasing its efficiency is outlined.

B68-10525  
DIGITAL LASER-BEAM DEFLECTION SENSOR  
FOWLER, V. J. /GEN. TELEPHONE AND ELECTRON.  
LABS./ DATE- NOV. 1968  
M-FS-14785

Sensor automatically and accurately measures the two-dimensional deflection angles of a laser beam to provide closed-loop servomechanism control of laser beam directivity.

B68-10529  
IMPROVED COMMUNICATION SYSTEM FOR LARGE  
OPERATIONS CENTER

DRAPER, M. S. /BOEING CO./ DATE- NOV. 1968  
M-FS-15016

When several microphones are fed into a common system, sound originating at any given source results in poor articulation. Introduction of an automatic microphone priority control suppresses echo and reverberation.

B68-10539  
ACTIVE RC FILTER PERMITS EASY TRADE-OFF  
OF AMPLIFIER GAIN AND SENSITIVITY TO GAIN  
KERWIN, W. J. SHAFFER, C. V. DATE- NOV. 1968  
ARC-10042

Passive RC network was designed with zeros of transmission in the right half of the complex frequency plane in the feedback loop of a simple negative-gain amplifier. The proper positioning provides any desired trade-off between amplifier gain and sensitivity to amplifier gain.

B68-10541  
FAILURE RATES FOR ACCELERATED ACCEPTANCE  
TESTING OF SILICON TRANSISTORS  
TOYE, C. R. DATE- NOV. 1968  
ERC-10198

Extrapolation tables for the control of silicon transistor product reliability have been compiled. The tables are based on a version of the Arrhenius statistical relation and are intended to be used for low- and medium-power silicon transistors.

B68-10542  
HIGH DIELECTRIC THICK FILMS FOR SCREENED  
CIRCUIT CAPACITORS  
ULRICH, D. R. DATE- DEC. 1968  
LANGLEY-10294

Techniques and materials have recently been developed to obtain high dielectric films /K of 300 to 800/. High dielectric barium titanate particles are mixed in a barium titanate glass.

B68-10543  
TEMPERATURE CONTROLLED STRAIN GAGED  
EXTENSOMETER  
RAMOS, G. L. SEPLow, S. /AEROJET GEN./ DATE-  
DEC. 1968  
LEWIS-10353

Temperature controlled strain-gaged extensometer measures longitudinal and girth deflections of pressure vessels in excess of one percent strain during pressurization and depressurization with cryogenic fluids at cryogenic temperatures. The device is of beryllium-copper strips.

B68-10544  
COOLING OF 2-KW H SUBSCRIPT 2-O SUBSCRIPT  
2 FUEL CELL  
ALLAN, K. N. BJORKMAN, H. K. ELBERT, T. E.  
HURLEY, J. R. /ALLIS-CHALMERS/ DATE- DEC. 1968  
M-FS-13737 M-FS-13740 M-FS-13749

An extensive research and development program has been carried out to devise an improved method of removing waste heat of reaction from a developmental 2KW hydrogen-oxygen fuel cell.

B68-10545  
A 35 GHZ SOLID STATE TRANSMITTER/DRIVER  
DE ANGELIS, X. A. DATE- DEC. 1968  
M-FS-20152  
Solid state transmitter/driver /multiplier/ signal source has been designed and fabricated to produce a stable crystal-controlled CW power output of 100 mw at 35 GHz.

B68-10547  
OPERATIONAL INTEGRATOR  
LUTZ, E. B. DATE- NOV. 1968  
NPO-10230

System operates in the nonreturn-to-zero mode, maintaining the increased bit density capability of this mode but with much higher noise immunity than conventional schemes offer. This integrator performs a mathematical integrating function on inputs from 100 Hz through 100 MHz.

B68-10555  
ELECTROLYTIC SILVER ION CELL STERILIZES  
WATER SUPPLY

## 02 PHYSICAL SCIENCES (ENERGY SOURCES)

ALBRIGHT, C. F. GILLERMAN, J. B. /GARRETT CORP./  
DATE- DEC. 1968 SEE ALSO NASA-CR-65738  
MSC-11827

Electrolytic water sterilizer controls microbial contamination in manned spacecraft. Individual sterilizer cells are self-contained and require no external power or control. The sterilizer generates silver ions which do not impart an unpleasant taste to water.

B68-10558  
COMBINATION PROBE FOR AIRFLOW MEASUREMENTS  
DUDZINSKI, T. J. GLAWE, G. E. KRAUSE, L. N.  
DATE- DEC. 1968  
LEWIS-10281

Probe combines a high-recovery shielded thermocouple for sensing total temperature, a total pressure sensing tube, and a flow direction sensing wedge having a 60 degree included angle.

B68-10559  
ACCELERATION INSENSITIVE FLUID EXPANSION  
COMPENSATOR  
HUGHES, L. F. /MIT/ DATE- OCT. 1968  
ERC-10152

Device compensates for temperature and acceleration effects on a fluid-floated mass in a sealed container of a high performance angular or acceleration sensing instrument. It is used in precision instruments for regulation of gases or liquids in a moving body.

B68-10562  
RELIABLE METHOD FOR TESTING GROSS LEAKS IN  
SEMICONDUCTOR COMPONENT PACKAGES  
ALTSHULER, T. L. DATE- DEC. 1968  
ERC-10150

Simple, reliable, inexpensive method for gross-leak testing has been devised, based upon the conventional fine-leak technique. The sensitivity ranges from the detection of very large leaks down to leaks of 10 to the minus seven cc helium per sec.

B68-10563  
PRESSURE-SENSITIVE BONDED JUNCTION  
TRANSDUCERS  
IANNINI, A. RINDNER, W. DATE- OCT. 1968  
ERC-10087

Miniature transducers involve the use of appropriate commercial epoxy resins. Design protects the sensitive semiconductor surface from ambients and excludes an air space in the device capsule.

B68-10565  
LOCATING \*\*SNEAK PATHS\*\* IN ELECTRICAL  
CIRCUITRY  
DANNBACK, T. M. /BOEING CO./ DATE- DEC. 1968  
M-FS-15018

Use of a matrix system wherein circuit pin connections are assigned arbitrary designators and these used in formation of the matrix is illustrated. The matrix is a format that shows the current paths.

B68-10566  
WELDING SKATE WITH COMPUTERIZED CONTROLS  
WALL, W. A., JR. DATE- NOV. 1968  
M-FS-20224

New welding skate concept for automatic TIG welding of contoured or double-contoured parts combines lightweight welding apparatus with electrical circuitry which computes the desired torch angle and positions a torch and cold-wire guide angle manipulator.

B68-10572  
DESIGN OF DISSIPATIVE LINEAR PHASE FILTERS  
PHARES, R. L. /SPACO, INC./ DATE- DEC. 1968  
M-FS-14698

Set of design curves eliminates work involved in designing linear phase filters by being normalized in such a way as to apply to low, band, and high-pass filters of any bandwidth. Similar curves for any number of poles are plotted by solving a system of simultaneous equations.

## 02 PHYSICAL SCIENCES (ENERGY SOURCES)

B68-10010  
FLOW TUBE USED TO COOL SOLAR-PUMPED  
LASER  
INNOVATOR NOT GIVEN /RCA/ DATE- JAN. 1968  
MSC-11026

A flow tube has been designed and constructed to provide two major functions in the application of a laser beam for transmission of both sound and video. It maintains the YAG laser at the proper operating temperature of 300 degrees K under solar pumping conditions, and it serves as a pump cavity for the laser crystal.

B68-10013  
METHOD OF MEASURING THERMAL CONDUCTIVITY OF  
HIGH PERFORMANCE INSULATION  
HYDE, E. H. RUSSELL, L. D. /LOCKHEED MISSILES  
AND SPACE CO./ DATE- JAN. 1968  
M-FS-14088

Method accurately measures the thermal conductivity of high-performance sheet insulation as a discrete function of temperature. It permits measurements to be made at temperature drops of approximately 10 degrees F across the insulation and ensures measurement accuracy by minimizing longitudinal heat losses in the system.

B68-10021  
OPTICAL SYSTEM FACILITATES INSPECTION OF  
PRINTED CIRCUIT BOARDS  
CRIDLIN, M. OCONNOR, J. DATE- JAN. 1968  
GSPC-07971

Optical comparator method determines the quality and registration of surface features of double-sided printed circuit boards. Color-coded superimposed images of both sides of a printed circuit board are presented to view, clearly showing details and registration of the circuitry.

B68-10060  
NEW TECHNIQUE FOR OPTIMAL SMOOTHING OF DATA  
FRASER, D. C. /MIT/ DATE- MAY 1968  
MSC-11354

Recursive method for the optimal smoothing of data has numerical superiority and is more easily understood in terms of physical reasoning than earlier methods. Using a Kalman filter, the smoothing technique, applied to a nonlinear parameter identification problem, is useful in those situations where linearization about a reference solution is valid.

B68-10071  
IMPROVED OPTICAL DIFFRACTOMETER  
BILDERBACK, R. R. DATE- MAR. 1968  
MSC-12055

Diffractionmeter is designed for diffraction measurements in the visible and near-infrared spectral regions. It provides higher resolution of diffraction patterns, an alternate illumination section for coherent light /from a laser source/, a unique alignment and adjustment arrangement for the optical system, and a very stable mounting.

B68-10077  
ELECTRONIC GATING CIRCUIT AND ULTRAVIOLET  
LASER EXCITATION PERMIT IMPROVED DOSIMETER  
SENSITIVITY  
EGGENBERGER, D. KING, D. LONGNECKER, A. SCHUTT,  
D. /NOTRE DAME UNIV./ DATE- APR. 1968  
ARG-10109

Standard dosimeter reader, modified by adding an electronic gating circuit to trigger the intensity level photomultiplier, increases readout sensitivity of photoluminescent dosimeter systems. The gating circuit is controlled by a second photomultiplier which senses a short ultraviolet pulse from a laser used to excite the dosimeter.

B68-10081  
INFRARED SPECTRORADIOMETER FOR ROCKET  
EXHAUST ANALYSIS  
HERGET, W. F. /N. AM. ROCKWELL CORP./ DATE- MAY



1968

M-FS-14357

Infrared spectroradiometer measures high-resolution spectral absorption, emission, temperature, and concentration of chemical species in radically symmetric zones of the exhaust plumes of large rocket engines undergoing static firing tests. Measurements are made along predetermined lines of sight through the plume.

B68-10090

ANTI GLARE IMPROVEMENT FOR OPTICAL IMAGING SYSTEMS

DAVIS, E. S. DATE- MAR. 1968

NPO-10337

Baffle configuration provides a more efficient shade against interfering sources of illumination outside the desired field of view of optical imaging systems. It consists of a semi-ellipsoid of revolution about the minor axis with black specular reflecting surface and an aperture defined by the locus of the foci of the generating ellipse.

B68-10098

RECTANGULAR CONFIGURATION IMPROVES SUPERCONDUCTING CABLE

FOSS, M. LAVERICK, C. LOBELL, G. DATE- APR. 1968

ARG-90088

Superconducting cable for a cryogenic electromagnet with improved mechanical and thermal properties consists of a rectangular cross-sectioned combination of superconductor and normal conductor. The conductor cable has superconductors embedded in a metallic coating with high electrical and mechanical conductivity at liquid helium temperatures.

B68-10108

STUDY OF CRYOGENIC CONTAINER THERMODYNAMICS DURING PROPELLANT TRANSFER

BROGAN, J. J. VERNON, R. M. /LOCKHEED MISSILES AND SPACE CO./ DATE- MAY 1968

M-FS-14310

Study of thermodynamic phenomena occurring during transfer of cryogenic liquids from dewar to receiver tank reveals that the basic cause of tank implosion is evaporation rate of droplets entering the tank in the early transfer phase. Analyses of the thermodynamics involved and implosion prevention techniques are included.

B68-10113

ROCKET ENGINE NOZZLE PHOTOGRAPHIC SYSTEM

BAILEY, R. L. TIBBITTS, W. C. DATE- APR. 1968

NPO-10174

Protective enclosure for a camera, located on the exhaust stream of a rocket engine, permits continuous recording of erosion processes of materials used in nozzle throat structures. The system uses a standard camera in a water-cooled, pressurized enclosure having a unique, inert gas-swept viewing duct.

B68-10119

MULTICHIP PACKAGING WITH THERMAL INSULATION MC INTURFF, R. G. MEND, W. G. /WESTINGHOUSE ELEC. CORP./ DATE- APR. 1968

M-FS-14076

Thermal insulation technique permits low and high power electronic chips to operate in the same package without thermal cross-coupling. An alumina glass shield thermally isolates the low power chip from the high power chip while Kovar substrate acts as a heat sink to remove heat from the high power chip.

B68-10126

OPTICAL INTEGRATING SPHERE OPERATES AT VISIBLE AND INFRARED WAVELENGTHS

AISENBERG, S. /SPACE SCI./ DATE- APR. 1968

M-FS-14248

An optical integrating sphere with a faceted reflective lining on the inside surface will provide light randomization /mixing of diffusely and specularly reflected light/ with relatively few reflections. The improved sphere has a

sufficiently high reflectivity for both visible and infrared radiation.

B68-10128

PHOTOGRAPHIC AND DRAFTING TECHNIQUES SIMPLIFY METHOD OF PRODUCING ENGINEERING DRAWINGS

PROVISOR, H. /N. AM. AVIATION/ DATE- APR. 1968

MSC-716

Combination of photographic and drafting techniques has been developed to simplify the preparation of three dimensional and dimetric engineering drawings. Conventional photographs can be converted to line drawings by making copy negatives on high contrast film.

B68-10135

ANTECHAMBER FACILITATES LOADING AND UNLOADING OF VACUUM FURNACE

KRAMER, P. J. MILLS, J. A. ORTH, N. W. QUATINETZ, M. WAGNER, J. G. DATE- APR. 1968

LEWIS-10265

Antechamber facilitates the use of a furnace in which materials are heat treated in a high vacuum or a gas atmosphere. It has a high vacuum pumping system, a means for backfilling with a selected gas, an access door, glove ports, and a motor driven platform.

B68-10136

THE X SQUARE STATISTIC AND GOODNESS OF FIT TEST

ARGENTIERO, P. D. MORRIS, R. A. /MARYLAND UNIV./

TOLSON, R. H. /NASA, LANGLEY RES. CENTER/ DATE- APR. 1968

GSFC-10547

The X square statistic is a useful measure of the discrepancy between the actual distribution of a set of data points and the theoretical distribution of a random variable of which the data points supposedly are values. Thus the X square statistic is frequently used in goodness of fit tests.

B68-10143

DEEP GAMMA RAY PENETRATION IN THICK SHIELDS

ARMSTRONG, T. W. STEVENS, P. N. /TENN. UNIV./ DATE- APR. 1968

M-FS-14388

Appropriate importance function and sampling scheme facilitates the application of the Monte Carlo method to problems involving the deep penetration of radiation.

B68-10154

TOOL RECONSTRUCTS DATA INPUT POINTS CORRESPONDING TO FIRST ORDER OUTPUT GRAPH

BTGGS, R. E. /N. AM. ROCKWELL CORP./ DATE- MAY 1968

M-FS-18003

Tool aids in graphic determination of input values for any first order lag system of known gain and time constant where the corresponding output function is displayed graphically and can be described by a first order differential equation. This tool permits a rapid reconstruction of input points.

B68-10160

ABSOLUTE LOW-PRESSURE CALIBRATION SYSTEM

ROEHRIG, J. R. /NATL. RES. CORP./ DATE- MAY 1968

M-FS-13085

McLeod gage is used as the primary reference standard in a system used for absolute calibration of vacuum gages in the very low pressure range. The system involves steady-state flow of a gas through a cascade of differentially pumped chambers or stages connected by precisely defined orifices.

B68-10170

LARGE-AMPLITUDE INVISCID FLUID MOTION IN AN ACCELERATING CONTAINER

PERKO, L. M. /LOCKHEED MISSILES AND SPACE CO./ DATE- JUN. 1968

MSC-11560

Study of dynamic behavior of the liquid-vapor interface of an inviscid fluid in an accelerating cylindrical container includes an

## 02 PHYSICAL SCIENCES (ENERGY SOURCES)

analytical-numerical method for determining large amplitude motion. The method is based on the expansion of the velocity potential in a series of harmonic functions with time dependent coefficients.

B68-10174

LOW SCATTER LIGHTWEIGHT FISSION SPECTROMETER  
CONSTRUCTED FOR BIOLOGICAL RESEARCH  
FRIGERIO, N. A. DATE- JUN. 1968

ARG-10094

Low scatter, lightweight fission spectrometer provides a simple, reliable method for determining absolute neutron fluxes in a fixed neutron. It minimizes neutron scatter and energy degradation effects, and has a counting volume large enough to intercept the most energetic fission fragments, yet small enough to be discriminating.

B68-10178

CONCEPT TO COMFORT-CONDITION SUBJECTS  
WEARING RESTRICTIVE CLOTHING

TUCKER, E. M. DATE- JUN. 1968

MSC-10964

Heat exchanger maintains a desirable thermal balance in a subject wearing restrictive clothing. A grid of high thermal conductance fibers, in contact with the skin, transfers heat to or from the skin surface by means of a system of ducts, carrying the transfer fluid which is maintained at a controlled temperature.

B68-10179

APPLICATION OF A TRUNCATED NORMAL FAILURE  
DISTRIBUTION IN RELIABILITY TESTING

GROVES, C., JR. /N. AM. ROCKWELL CORP./ DATE-  
JUN. 1968

M-FS-14328

Statistical truncated normal distribution function is applied as a time-to-failure distribution function in equipment reliability estimations. Age-dependent characteristics of the truncated function provide a basis for formulating a system of high-reliability testing that effectively merges statistical, engineering, and cost considerations.

B68-10181

STUDY OF CONVECTIVE MAGNETOHYDRODYNAMIC  
CHANNEL FLOW

SINGER, R. M. DATE- JUN. 1968 SEE ALSO

ANL-6937

ARG-10102

Study involves the effects of the interactions of electromagnetic, velocity, and temperature fields to aid in the design of a magnetohydrodynamic device. It concerns a theoretical analysis of the convective flow of an electrically conducting gas in a channel composed of conducting walls.

B68-10186

MAGNETIC FORMING STUDIES

FURTH, H. P. HOLT, D. R. JATMUZ, P. J. MEHRA,  
R. C. WANIEK, R. W. /ADVANCED KINET./ DATE-  
JUN. 1968 SEE ALSO B65-10342

M-FS-14217

Investigation of the tensile strength dependability on the characteristic time over which a pressure pulse is applied to a metal workpiece shows that the mechanical properties of these materials are functions of the rate at which the material is undergoing strain. These results and techniques are used in magnetomotive metal forming.

B68-10190

PROCEDURE DEVELOPED FOR REPORTING  
FAST-NEUTRON EXPOSURE

ROSSIN, A. D. DATE- JUN. 1968 SEE ALSO

ANL-6826

ARG-10035

Procedure for reporting fast-neutron exposure involves determination of the spectrum shape and absolute magnitude, selection of an energy weighting for the neutrons, and definition of a unit for reporting exposure. Using this method, comparisons of irradiation data from different reactors will be free from errors resulting from differences between the spectra.

B68-10228

THEORY OF A REFINED EARTH MODEL

KRAUSE, H. G. L. DATE- JUN. 1968

M-FS-14679

Refined equations are derived relating the variations of the earth's gravity and radius as functions of longitude and latitude. They particularly relate the oblateness coefficients of the odd harmonics and the difference of the polar radii /respectively, ellipticities and polar gravity accelerations/ in the northern and southern hemispheres.

B68-10234

DESIGN TECHNIQUES - STOCHASTIC CONTROLLERS

WIDNALL, W. S. /MIT/ DATE- JUL. 1968

MSC-11554

Analytic techniques aid in the design of nearly optimal linear time-varying sampled-data stochastic controllers. The techniques also aid in the simplification and automation of program designing for control computers.

B68-10240

PROPERTIES OF OPTICS AT HIGH TEMPERATURE AND  
THEIR MEASUREMENT, A STUDY

GATES, D. W. DATE- JUL. 1968

M-FS-14696

Bibliography lists, the sources containing emissivity and absorptivity data on materials at extremely high temperatures. The experimental techniques, equipment and efforts of the experimenters to characterize the materials used and methods to evaluate the errors are given in the sources in this bibliography.

B68-10243

PORTABLE, HIGH INTENSITY ISOTOPIC NEUTRON  
SOURCE PROVIDES INCREASED EXPERIMENTAL  
ACCURACY

MOHR, W. C. STEWART, D. C. WAHLGREN, M. A.  
DATE- JUL. 1968 SEE ALSO ANL-6917 AND

ANL-6933

ARG-90250

Small portable, high intensity isotopic neutron source combines twelve curium--americium--beryllium sources. This high intensity of neutrons, with a flux which slowly decreases at a known rate, provides for increased experimental accuracy.

B68-10245

IMPROVED RELAY OPTICAL ELEMENT FOR  
SPECTRORADIOMETER USING CRYOGENICALLY  
COOLED DETECTOR

KRAMER, A. R. /LOCKHEED MISSILES AND SPACE CO./  
DATE- JUL. 1968

MSC-11688

By coating half of one element in the relay optical system of a spectroradiometer with a very high emissivity paint, the effect of the reflected radiation from the back of the filter wheel is eliminated optically. This causes the detector to view a constant level of radiation, regardless of how the reflectivity of the back of the filter wheel changes.

B68-10252

NEW METHOD FOR CRITICAL FAILURE PREDICTION  
OF COMPLEX SYSTEMS

COX, C. T. EAGLE, K. H. MALIK, D. F. WOLIN, S.  
/BOEING CO./ DATE- JUL. 1968

M-FS-14133

Rigorous analytical technique, called criticality determination methodology /or CD technique/ determines the probability that a given complex system will successfully achieve stated objectives. The CD technique identifies critical elements of the system by a failure mode and effects analysis.

B68-10255

ELECTRO-OPTIC MODULATOR FOR INFRARED LASER  
USING GALLIUM ARSENIDE CRYSTAL

WALSH, T. E. /RCA/ DATE- JUL. 1968

GSFC-10686

Gallium arsenide electro-optic modulator used for infrared lasers has a mica quarter-wave plate and two calcite polarizers to amplitude- or phase

modulate an infrared laser light source in the wavelength range from 1 to 3 microns. The large single crystal has uniformly high resistivities, is strain free, and comparable in quality to good optical glass.

B68-10259

# FLUORESCENT PARTICLES ENABLE VISUALIZATION OF GAS FLOW

WILSON, A. J. /N. AM. ROCKWELL CORP./ DATE- JUL. 1968 SEE ALSO B66-10668  
M-FS-14583

Fluorescent particles enable visualization of the flow patterns of gases at slow velocities. Through a transparent section in the gas line, a camera views the visible light emitted by the particles carried by the gas stream. Fine definition of the particle tracks are obtained at slow camera shutter speeds.

B68-10260

# TECHNIQUE DEVELOPED FOR MEASURING TRANSMITTANCE OF OPTICAL BIREFRINGENT NETWORKS

AMMANN, E. O. YARBOROUGH, J. M. /SYLVANIA PROD./ DATE- AUG. 1968 SEE ALSO B68-10275  
M-FS-14267

The transmission characteristics of synthesized optical single-pass and double-pass birefringent networks is obtained by measuring network transmission as a function of network temperature. This technique is most useful for testing those birefringent networks whose bandwidths and periods are very small.

B68-10265

# ACOUSTIC WAVE ANALYSIS

JACKSON, E. D. /N. AM. ROCKWELL CORP./ DATE- JUL. 1968  
M-FS-18076

The primary mechanism for generation of acoustic waves in a centrifugal pump, due to the rotor/stator interaction, is an unsteady source at the entrance of the blade row as represented by the unsteady velocity field. The amplitude of wave generated by pressure loading on the blades and by velocity boundary condition are compared.

B68-10275

# SYNTHESIS OF ELECTRO-OPTIC MODULATORS FOR AMPLITUDE MODULATION OF LIGHT

AMMANN, E. O. YARBOROUGH, J. M. /SYLVANIA ELEC. PROD./ DATE- AUG. 1968  
M-FS-14268

Electro-optical modulator realizes voltage transfer function in synthesizing birefringent networks. Choice of the voltage transfer function is important, the most satisfactory optimizes the modulator property.

B68-10276

# SOLUTION OF DIFFERENTIAL EQUATIONS BY APPLICATION OF TRANSFORMATION GROUPS

DRISKELL, C. N., JR. GALLAHER, L. J. MARTIN, R. H., JR. /GEORGIA INST. OF TECH./ DATE- AUG. 1968  
M-FS-14802

Report applies transformation groups to the solution of systems of ordinary differential equations and partial differential equations. Lie's theorem finds an integrating factor for a system of ordinary differential equations when the appropriate invariance group or groups can be found and can be extended to partial differential equations.

B68-10282

# HIGH-SPEED CAMERA SYNCHRONIZATION

ROJEC, E. A. /N. AM. ROCKWELL CORP./ DATE- AUG. 1968  
M-FS-18062

Photoelectric sensor enables synchronization of the rotating mirror in a high-speed framing camera with the passage of a very-high-velocity droplet to obtain direct photographic data on droplet breakup. It detects droplet movement across a high intensity light beam and generates a signal triggering the camera.

B68-10293

# ISOTOPICALLY PURE MAGNESIUM ISOTOPE-24 IS

## PREPARED FROM MAGNESIUM-24 OXIDE

CHELLEW, N. R. SCHILB, J. D. STEUNENBERG, R. K. DATE- AUG. 1968  
ARG-10154

Apparatus is used to prepare isotopically pure magnesium isotope-24, suitable for use in neutron scattering and polarization experiments. The apparatus permits thermal reduction of magnesium-24 oxide with aluminum and calcium oxide, and subsequent vaporization of the product metal in vacuum. It uses a resistance-heated furnace tube and cap assembly.

B68-10294

# STUDY OF RADIATION EFFECTS ON MAMMALIAN CELLS IN VITRO

SINCLAIR, W. K. DATE- AUG. 1968  
ARG-10191

Radiation effect on single cells and cell populations of Chinese hamster lung tissue is studied in vitro. The rate and position as the cell progresses through the generation cycle shows division delay, changes in some biochemical processes in the cell, chromosomal changes, colony size changes, and loss of reproductive capacity.

B68-10298

# DETECTION SENSITIVITIES IN 3-8 MEV

## NEUTRON ACTIVATION

WAHLGREN, M. A. WING, J. DATE- AUG. 1968  
SEE ALSO ANL-7242  
ARG-10210

Study of detection sensitivities of 73 radioactive elements using fast unmoderated neutrons includes experiments for irradiation, cooling and counting conditions. The gamma ray emission spectra is used to identify the unknown material.

B68-10304

# IMPROVED GAS RING LASER

COCOLI, J. D. LAWSON, J. R. /MIT/ DATE- AUG. 1968  
MSC-11584

Minimizing mode coupling improves sensing resolution of a gas ring laser in a gimballess gyroscope system or inertial rotation sensor. The piezoelectric-driven corner mirrors of the ring laser are oscillated in a direction parallel to their surfaces and the plane of rotation.

B68-10322

# MODIFIED SINE BAR DEVICE MEASURES SMALL ANGLES WITH HIGH ACCURACY

THEKAEKARA, M. DATE- AUG. 1968  
GSFC-438

Modified sine bar device measures small angles with enough accuracy to calibrate precision optical autocollimators. The sine bar is a massive bar of steel supported by two cylindrical rods at one end and one at the other.

B68-10326

# 4 PI-RECOIL PROPORTIONAL COUNTER USED AS NEUTRON SPECTROMETER

BENNETT, E. F. DATE- AUG. 1968 SEE ALSO ANL-6897  
ARG-10101

Study considers problems encountered in using 4 pi-recoil counters for neutron spectra measurement. Emphasis is placed on calibration, shape discrimination, variation of W, the average energy loss per ion pair, and the effects of differentiation on the intrinsic counter resolution.

B68-10329

# HIGH-SPEED PULSE CAMERA

LAWSON, J. R. /MIT/ DATE- AUG. 1968  
MSC-11353

Miniaturized, 16 mm high speed pulse camera takes spectral photometric photographs upon instantaneous command. The design includes a low-friction, low inertia film transport, a very thin beryllium shutter driven by a low-inertia stepper motor for minimum actuation time after a pulse command, and a binary encoder.

## 02 PHYSICAL SCIENCES (ENERGY SOURCES)

B68-10339

DYNAMICS OF MOVING BUBBLES IN SINGLE AND BINARY COMPONENT SYSTEMS

CLARK, J. A. MERTE, H., JR. TOKUDA, N. YANG, W. J. /MICHIGAN UNIV./ DATE- SEP. 1968  
M-FS-14845

Dynamics of a single bubble moving in a quiescent liquid is analyzed for single and binary component systems. The transport of energy and/or mass at thermodynamic-phase equilibrium governs the dynamics of the bubble at its interface.

B68-10345

INDEPENDENT DOUBLY TRUNCATED GAMMA VARIABLES

LAVENDER, D. E. /GEORGIA UNIV./ DATE- SEP. 1968  
M-FS-20143

Density and distribution functions of the sum of independent variables, each having a truncated gamma density function, were derived for use in the measurement of complex physical phenomena.

B68-10346

CONTROLLABILITY OF DISTRIBUTED-PARAMETER SYSTEMS

HERGET, C. J. /CALIF. UNIV./ DATE- SEP. 1968  
M-FS-14929

Controllability of distributed-parameter control systems is mathematically studied. A general theory for control systems includes those that cannot be described by ordinary differential equations.

B68-10347

IMPROVEMENT IN RECORDING AND READING HOLOGRAMS

HALLOCK, J. N. DATE- SEP. 1968  
ERC-10151

Three-beam technique superimposes a number of patterns in the same plane of a hologram and then uniquely identifies each pattern by a suitable readout process. The developed readout process does not require any movement of parts.

B68-10348

STUDY OF OPTIMUM DISCRETE ESTIMATORS IN MEASUREMENT ANALYSIS

HUNG, J. C. IRWIN, J. D. /TENNESSEE UNIV./ DATE- SEP. 1968  
M-FS-14915

Study of statistical techniques for obtaining estimates of true data parameters uses discrete measured quantities containing random error. These techniques develop estimation procedures as an iterative algorithm for digital computation in real time.

B68-10349

LASER DOPPLER GAS-VELOCITY INSTRUMENT

BOOTH, S. MEISTER, K. ROLFE, E. SILK, J. K. YOUNG, R. M. /RAYTHEON CO./ DATE- SEP. 1968  
SEE ALSO B66-10693  
M-FS-20039

Three-D instrument using a laser light source measures both turbulence and mean velocity of subsonic and supersonic gas flows. This instrument is based on the measurement of the Doppler frequency shift of light waves scattered by moving particles in the gas stream.

B68-10363

IMPROVED RADIOGRAPHIC IMAGE AMPLIFIER PANEL

BROWN, R. L., SR. DATE- OCT. 1968  
M-FS-14522

Layered image amplifier for radiographic /X-ray and gamma ray/ applications, combines very high radiation sensitivity with fast image buildup and erasure capabilities by adding a layer of material that is both photoconductive and light-emitting to a basic image amplifier and cascading this assembly with a modified Thorne panel.

B68-10396

EVALUATION OF SUPERCONDUCTING MAGNETS, A STUDY

DI SALVO, F. LUCAS, E. STEKLY, Z. J. J. STRAUSS, B. P. THOME, R. /AVCO EVERETT RES. LAB./ DATE- OCT. 1968  
M-FS-14808

Study analytically develops and experimentally

verifies the steady state behavior characteristics of composite superconductors. Zero-dimensional, one-dimensional, and three-dimensional analyses were performed.

B68-10406

FIBERGLASS PREVENTS CRACKING OF POLYURETHANE FOAM INSULATION ON CRYOGENIC VESSELS

FORCE, D. A. /MCDONNELL DOUGLAS CORP./ DATE- NOV. 1968  
M-FS-20058

Fiberglass material, placed between polyurethane foam insulation and the outer surfaces of cryogenic vessels, retains its resilience at cryogenic temperatures and provides an expansion layer between the metal surfaces and the polyurethane foam, preventing cracking of the latter.

B68-10418

MINIATURIZED KING FURNACE PERMITS ABSORPTION SPECTROSCOPY OF SMALL SAMPLES

ERCOLI, B. TOMPKINS, F. S. DATE- NOV. 1968  
ARG-10177

Miniature King-type furnace, consisting of an inductively heated, small diameter tantalum tube supported in a radiation shield eliminates the disadvantages of the conventional furnace in obtaining absorption spectra of metal vapors.

B68-10426

CERIC AND FERROUS DOSIMETERS SHOW PRECISION FOR 50-5000 RAD RANGE

FRIGERIO, N. A. HENRY, V. D. DATE- NOV. 1968  
ARG-10173

Ammonium thiocyanate, added to the usual ferrous sulfate dosimeter solution, yielded a very stable, precise and temperature-independent system - eight times as sensitive as the classical Fricke system in the 50 to 5000 rad range. The ceric dosimeters, promising for use in mixed radiation fields, respond nearly independently of LET.

B68-10504

SOLVING NONLINEAR HEAT TRANSFER CONSTANT AREA FIN PROBLEMS

DATE- NOV. 1968  
M-FS-14851

Tables and graphs were compiled for solving nonlinear heat transfer constant area fin problems. The differential equation describing one-dimensional steady-state temperature distribution and heat flow under three modes of heat transfer with heat generation was investigated.

B68-10506

DUAL-PURPOSE CHAMBER-COOLING SYSTEM

FRAZE, R. E. DATE- NOV. 1968  
NPO-10467

Inexpensive, portable system was designed for cooling small environmental test chambers with a temperature-controlled gas stream evaporated from a cryogenic liquid. The system reduces the temperature of a chamber to any desired point in a fraction of the time required by previous systems.

B68-10508

COOLANTS WITH SELECTIVE OPTICAL FILTERING CHARACTERISTICS FOR RUBY LASER APPLICATIONS

MC DEVITT, F. R. /AUBURN UNIV./ RASQUIN, J. R. DATE- NOV. 1968  
M-FS-20188

Coolant-filtering medium developed consists of a solution of copper sulfate in a 4-1 volumetric mixture of ethanol and methanol. This solution should be a useful addition to ruby laser systems, particularly in large pulse or Q-switching applications.

B68-10510

HEAT-LOAD SIMULATOR FOR HEAT SINK DESIGN

DUNLEAVY, A. M. VAUGHN, T. J. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968  
MSC-15170

Heat-load simulator is fabricated from 1/4-inch aluminum plate with a contact surface equal in dimensions and configuration to those of the

electronic installation. The method controls thermal output to simulate actual electronic component thermal output.

**B68-10517  
HEAT TRANSFER COEFFICIENTS FOR LIQUID  
HYDROGEN TURBOPUMPS**

BISSEL, W. R. WAGNER, W. R. /N. AM. ROCKWELL  
CORP./ DATE- NOV. 1968  
M-FS-18345

Empirical equations were derived to establish the appropriate heat transfer coefficients as functions of the temperature drops and heat transfer rates for a wide range of convective and boiling conditions at different locations in a liquid hydrogen turbopump.

**B68-10519  
HIGH CONDUCTANCE VAPOR THERMAL SWITCH**

HYMAN, N. L. DATE- SEP. 1968  
GSFC-10109

High conductance vapor thermal switch was produced to maintain heat dissipating component temperatures within acceptable limits. The switch is a self-actuating, automatic device that regulates the rate of heat flow to control.

**B68-10521  
TELESCOPE DOME CONTROL SYSTEM AUTOMATICALLY  
TRACKS SUN**

CASHION, K. D. DATE- NOV. 1968  
MSC-10966

Automatic control system is designed to rotate a dome so that a telescope, or other instruments, within the dome will continuously view the sun as the earth rotates.

**B68-10533  
A MASS FLUX PROBE FOR MEASUREMENT IN A  
SUPERSONIC STREAM**

GLAWE, G. E. KRAUSE, L. N. DATE- DEC. 1968  
LEWIS-10695

Probe consists essentially of a tube with a supersonic inlet pointed into the gas stream. The mass flow rate through the tube is determined at a flow measuring station.

**B68-10546  
IMAGING SLITLESS SPECTROMETER FOR X-RAY  
ASTRONOMY**

GURSKY, H. ZEHPFENNIG, T. /AM. SCI. AND ENG./  
DATE- NOV. 1968  
M-FS-14309

Imaging slitless spectrometer, a combination of an X ray transmission /or reflection/ grating and image-forming X ray telescope, is capable of obtaining simultaneous spatial and spectral information about celestial X ray sources.

**B68-10548  
ONE-DIMENSIONAL COULOMB-DAMPED WAVE MOTION  
IN PRISMATIC BARS**

TOMLIN, D. D., JR. DATE- DEC. 1968  
M-FS-14815

Study analyzes wave motions in prismatic bars with coulomb damping, using Laplace transforms as an aid in solving the partial differential equations. The results are detailed.

**B68-10556  
ELECTRON BEAM RECRYSTALLIZATION OF AMORPHOUS  
SEMICONDUCTOR MATERIALS**

EVANS, J. C., JR. DATE- DEC. 1968  
LEWIS-10443

Nucleation and growth of crystalline films of silicon, germanium, and cadmium sulfide on substrates of plastic and glass were investigated. Amorphous films of germanium, silicon, and cadmium sulfide on amorphous substrates of glass and plastic were converted to the crystalline condition by electron bombardment.

**B68-10560  
SHORTENED PROCEDURE FOR OBTAINING  
REPRODUCIBLE COPIES OF 35 MM COLOR SLIDES**

LEVINE, F. /BOEING CO./ DATE- DEC. 1968  
KSC-09957

Technique to reduce the steps required to obtain reproducible copies of 35 mm color slides has been

developed. A 35 mm slide is projected directly onto a Xerox plate, eliminating the necessity to produce a film positive of the slide.

**B68-10564  
REPETITIVELY PULSED, WAVELENGTH-SELECTIVE  
CARBON DIOXIDE LASER**

HANST, P. L. DATE- NOV. 1968  
ERC-10178

Carbon dioxide laser as a simple portable unit generates coherent light pulses at selected infrared wavelengths. The improved laser was designed for the detection of air pollutants but can be applied to optical communications.

**B68-10569  
ACCURATE DIGITAL TECHNIQUE SIMULATES FLIGHT  
CONTROL SYSTEM**

HAYS, J. R. /BOEING CO./ DATE- NOV. 1968  
M-FS-14787

Fast, accurate technique for simulating the Saturn Flight Control System was devised. The technique is simple to implement and can be readily substituted for slower or less accurate techniques. This technique can be applied to a large class of problems that require a rapid accurate calculation of the response of linear differential equations to a continuous input.

**B68-10570  
IMPROVED TECHNIQUE FOR DIGITAL SIMULATION  
OF BENDING AND SLOSH PHENOMENA**

STAUFFER, N. E. /BOEING CO./ DATE- NOV. 1968  
M-FS-14788

Mathematical model representation of bending and slosh phenomena in the Saturn 5 vehicle results in linear second order differential equations. Improved technique was developed to provide a real-time digital solution of the equations. The technique may also be applied to non-real-time digital simulations, resulting in savings of digital computer time.

**B68-10571  
CORRECTION FOR LOSSES IN OPTICAL  
BIREFRINGENT NETWORKS, A CONCEPT**

AMMAN, E. O. /SYLVANIA ELEC. PROD./ DATE- NOV. 1968  
SEE ALSO B68-10260 AND B68-10275  
M-FS-20088

Technique determines the effects of losses upon the performance of a birefringent network and shows how the desired amplitude transmittance of the network may be corrected /or predistorted/, prior to synthesizing the birefringent network, to prevent the effects of crystal losses.

**B68-10574  
TRAINING MANUAL ON OPTICAL ALIGNMENT  
INSTRUMENTS**

DATE- DEC. 1968  
M-FS-20292

Training Manual RQA/M5 provides a basic course of instruction in the use of optical instruments for precise dimensional control and alignment of structural elements and assemblies, such as associated with space vehicles, aircraft, ships, and buildings.

## 03 MATERIALS (CHEMISTRY)

**B68-10020  
DISTILLATION DEVICE SUPPLIES CESIUM VAPOR AT  
CONSTANT PRESSURE**

BASIULIS, A. SHEFSIEK, P. K. /RCA/ DATE- FEB. 1968  
XNP-08124

Distillation apparatus in the form of a U-tube supplies small amounts of pure cesium vapor at constant pressure to a thermionic converter. The upstream leg of the U-tube is connected to a vacuum pump to withdraw noncondensable impurities, the bottom portion serves as a reservoir for the liquid cesium.

**B68-10023  
HASTELLOY X PROPERTIES, DATA, AND**

### 03 MATERIALS (CHEMISTRY)

#### METALLURGICAL CHARACTERISTICS

GLASIER, L. F., JR. /AEROJET-GEN. CORP./ DATE- FEB. 1968  
NUC-10302

Literature survey and testing program were initiated to obtain pertinent information for Hastelloy X, a nickel-base alloy, through the temperature range of minus 423 degrees to 1800 degrees F. A report has been prepared which includes the tensile properties, mechanical properties, and the manufacturing and fabrication processes.

B68-10029

#### HEAT TREATMENT PROCEDURE TO INCREASE DUCTILITY OF DEGRADED NICKEL ALLOY

PRAGER, M. /N. AM. AVIATION/ DATE- FEB. 1968  
M-FS-12410

Tests demonstrate the room temperature ductility of degraded Rene 41 can be increased to acceptable values by solution heat treatment at a temperature of 2050 degrees to 2150 degrees F /1 to 2 hours/ and cooling through a controlled temperature range followed by normal aging in air /16 hours at 1400 degrees F/.

B68-10031

#### PANELIZED HIGH PERFORMANCE MULTILAYER INSULATION

BURKLEY, R. A. SHRIVER, C. B. /GOODYEAR AEROSPACE CORP./ STUCKEY, J. M. DATE- FEB. 1968  
M-FS-14023

Multilayer insulation coverings with low conductivity foam spacers are interleaved with quarter mil aluminized polymer film radiation shields to cover flight type liquid hydrogen tankage of space vehicles with a removable, structurally compatible, lightweight, high performance cryogenic insulation capable of surviving extended space mission environments.

B68-10032

#### SURVEY MADE OF REFRACTORY METALS

AULT, G. M. DATE- FEB. 1968  
LEWIS-10380

Survey reviews the structural applications of refractory metals and the special problems they present in manufacture, evaluation, and application. The unique facilities required for their processing and evaluation, a summary of accomplishments in achieving commercial products, and the present status of the most advanced refractory materials are presented.

B68-10034

#### CONTINUOUS DETONATION REACTION ENGINE

LANGE, O. H. STEIN, R. J. TUBBS, H. E. DATE- FEB. 1968  
M-FS-14019

Reaction engine operates on the principles of a controlled condensed detonation rather than on the principles of gas expansion. The detonation results in reaction products that are expelled at a much higher velocity.

B68-10043

#### CURE OF EPOXY RESINS DETERMINED BY SIMPLE TESTS

LADAKI, M. NIGH, W. G. /N. AM. AVIATION/ DATE- FEB. 1968

M-FS-13131 M-FS-13132

Rapid visual and simple quantitative tests indicate the degree of cure of particular epoxy resin binders in prepreg stock. It is possible that these tests may be extended to a number of different epoxy formulations.

B68-10046

#### SURVEY OF FRACTURE TOUGHNESS TEST METHODS

BROWN, W. F., JR. JONES, M. H. SRAWLEY, J. E. DATE- MAR. 1968 SEE ALSO NASA-TN-D-2599

AND ASTM-NASA-STP-410

LEWIS-10379

Comprehensive survey presents current methods of fracture toughness testing that are based on linear elastic fracture mechanics. General principles of the basic two dimensional crack stress field model are discussed in relation to real three dimensional specimens. Methods of

test instrumentation and procedure are described.

B68-10048

#### SIMPLE TEST FOR PHYSICAL STABILITY OF CRYOGENIC TANK INSULATION

ROSSELLO, D. /DOUGLAS AIRCRAFT CO./ DATE- MAR. 1968

M-FS-12547

Qualitative test determines the ability of insulation liners used on liquid hydrogen tanks to withstand stresses produced by the thermal shocks imparted to the insulation during tank filling and drainage. Test specimens are bonded to metal plates with a low thermal expansion coefficient and are immersed in liquid hydrogen.

B68-10049

#### METHOD OF MAINTAINING ACTIVITY OF HYDROGEN-SENSING PLATINUM ELECTRODE

HARMAN, J. N., III /BECKMAN INSTR./ DATE- MAR. 1968

M-FS-1422

Three-electrode hydrogen sensor containing a platinum electrode maintained in a highly catalytic state, operates with a minimal response time and maximal sensitivity to the hydrogen gas being sensed. Electronic control and readout circuitry reactivates the working electrode of the sensor to a state of maximal catalytic activity.

B68-10062

#### PYROTECHNIC DEVICE PROVIDES ONE-SHOT HEAT SOURCE

HALLER, H. C. LALLI, V. R. /TRW EQUIPMENT LABS./ DATE- MAR. 1968

LEWIS-10131

Pyrotechnic heater provides a one-shot heat source capable of creating a predetermined temperature around sealed packages. It is composed of a blend of an active chemical element and another compound which reacts exothermically when ignited and produces fixed quantities of heat.

B68-10066

#### STATIC STRUCTURAL ANALYSIS OF SHELL-TYPE STRUCTURES

BAKER, E. H. CAPPELLI, A. P. KOVALEVSKY, L. RISH, F. L. VERRETTE, R. M. /N. AM. AVIATION/ DATE- MAR. 1968 SEE ALSO NASA-CR-912

MSC-11555

Shell analysis manual provides methods for determining static deflections and internal load and stress distributions in shells under various loading conditions, and methods of analyzing static instability of shell structures. Also included are methods for determining the lightest shell wall for various constructions.

B68-10085

#### REINFORCED THERMAL-SHOCK RESISTANT CERAMICS

CRUMP, D. N. /THOMPSON RAMO WOOLDRIDGE/ DATE- MAY 1968

LEWIS-10376

Composite material, made by dispersing short tungsten-rhenium fibers randomly throughout zirconium oxide, is highly resistant to oxidizing environments at temperatures above 2000 degrees F. This reinforced ceramic is also thermal stress resistant.

B68-10092

#### MOLDING A HIGH-DENSITY LAMINATE

HARAWAY, W. M. HEIER, W. C. KING, C. B. DATE- MAR. 1968

LANGLEY-10051

Molding press is used to form phenolic resin impregnated glass fiber cloth into a high-density, cylindrical-ring laminate. The press applies clamping pressure and heat to a mold containing the glass fiber cloth laminate, which has hydrostatic pressure applied to it by means of a specially designed pressure plug.

B68-10094

#### HIGH STRENGTH NICKEL-BASE ALLOY WITH IMPROVED OXIDATION RESISTANCE UP TO 2200 DEGREES F

FRECHE, J. C. WATERS, W. J. DATE- APR. 1968  
LEWIS-10115

Modifying the chemistry of the NASA TAZ-8 alloy and utilizing vacuum melting techniques provides a high strength, workable nickel base \*\*superalloy\*\* with improved oxidation resistance for use up to 2200 degrees F.

B68-10095

COBALT-TUNGSTEN, FERROMAGNETIC HIGH-TEMPERATURE ALLOY

ASHBROOK, R. L. DRESHFIELD, R. L. FRECHE, J. C. HOFFMAN, A. C. SANDROCK, G. D. DATE- APR. 1968

SEE ALSO NASA-TN-D-4338

LEWIS-10378

Cobalt-base alloy which combines high temperature strength and magnetic properties has a composition in weight percent of 7-1/2 tungsten, 2-1/2 iron, 1 titanium, 1/2 zirconium, 1/2 carbon, and the balance cobalt. It may be used as construction material for electric motors and generators operating at high temperatures.

B68-10101

REACTION RATES OF GRAPHITE WITH OZONE MEASURED BY ETCH DECORATION

HENNIG, G. R. MONTET, G. L. DATE- APR. 1968

ARG-10086

Etch-decoration technique of detecting vacancies in graphite has been used to determine the reaction rates of graphite with ozone in the directions parallel and perpendicular to the layer planes. It consists essentially of peeling single atom layers off graphite crystals without affecting the remainder of the crystal.

B68-10102

ANALYTICAL TECHNIQUES FOR DETERMINING BORON IN GRAPHITE

HENNIG, G. R. MONTET, G. L. DATE- APR. 1968

ARG-10087

Two analytical techniques, a gold nucleation and an etch-decoration technique have been developed for determining the presence and mobility of boron in graphite.

B68-10103

GLASSY MATERIALS INVESTIGATED FOR NUCLEAR REACTOR APPLICATIONS

LYNCH, E. D. DATE- APR. 1968 SEE ALSO

ANL-7062

ARG-10075

Studies determine the feasibility of preparing fuel-bearing glasses and glasses bearing neutron-absorbing materials for use as crystalline fuel and control rods for reactors. Properties investigated were devitrification resistance, urania solubility, and density.

B68-10104

DECOMPOSITION VESSEL

BERNAS, B. /NATL. ACAD. OF SCI./ DATE- MAR. 1968

GSFC-10343

Stainless steel crucible-shaped vessel permits rapid decomposition of silicates and other refractory compounds by acids at relatively low temperatures. The vessel is lined with tetrafluoroethylene fluorocarbon resin and sealed by a sheet of the same material retained in a stainless steel screw cap.

B68-10105

BLAST DEFLECTOR TRAPS SMOKE AND DEBRIS FROM EXPLOSIVE TRAINS

WILKOWSKI, J. C. /N. AM. AVIATION/ DATE- MAR. 1968

MSC-11241

Blast deflector protects interior areas and personnel from the smoke and debris of explosive trains. It contains open-cell foam to absorb the pressure loads generated by explosive charges and control the smoke and debris.

B68-10109

TUNGSTEN-RHENIUM ALLOY THERMOCOUPLES EFFECTIVE FOR HIGH-TEMPERATURE MEASUREMENT

BROOKS, E. J. KRAMER, W. C. DATE- APR. 1968

SEE ALSO ANL-6981

ARG-10059

Tungsten-rhenium alloy thermocouples, specifically, insulated, sheathed W/W plus 26Re

and W plus 5Re/W plus 26Re thermocouples, are effective for temperature measurement in excess of 2920 degrees C. These thermocouples have a high thermoelectric output and excellent relationship to temperatures up to 2760 degrees C.

B68-10142

DEVICE PROVIDES CONTROLLED GAS LEAKS

KAMI, S. K. KING, H. J. /HUGHES AIRCRAFT CO./

DATE- APR. 1968

NPO-10298

Modified palladium leak device provides a controlled release /leak/ of very small quantities of gas at low or medium pressures. It has no moving parts, requires less than 5 watts to operate, and is capable of releasing the gas either continuously or in pulses at adjustable flow rates.

B68-10146

LAMINATED SHEET COMPOSITES REINFORCED WITH MODULAR FILAMENT SHEET

REECE, O. Y. DATE- MAY 1968

M-FS-14575

Aluminum and magnesium composite sheet laminates reinforced with low density, high strength modular filament sheets are produced by diffusion bonding and explosive bonding. Both processes are accomplished in normal atmosphere and require no special tooling or cleaning other than wire brushing the metal surfaces just prior to laminating.

B68-10153

STUDY OF CRACK INITIATION PHENOMENA ASSOCIATED WITH STRESS CORROSION OF ALUMINUM ALLOYS

HUNTER, M. S. /ALUMINUM CO. OF AM./ DATE- MAY 1968

M-FS-14283

Study of stress corrosion cracks in aluminum alloys reveals that crack initiation is greatly influenced by boundary orientation and directionality of the structure. In all crack susceptible materials, intergranular corrosion and stress corrosion cracking started and progressed in boundaries oriented perpendicularly to the stressing direction.

B68-10167

EVALUATION OF IGNITION MECHANISMS IN SELECTED NONMETALLIC MATERIALS

GERSTEIN, M. MC LAIN, M. ROSS, W. /DYN. SCI. CORP./ DATE- MAY 1968

MSC-11645 MSC-11646 MSC-11647

Test program evaluates thermal and electric ignition mechanisms in selected nonmetallic materials found in spacecraft with concentrated oxygen atmospheres. The phenomena evaluated were spontaneous ignition, ignition of flammable vapor by a spark, and ignition by an arc where the arc produces the combustible vapor and the ignition source.

B68-10172

STUDY REVEALS EFFECT OF ALUMINUM ON SATURATION MOMENT OF FE-NI ALLOYS

ALDRED, A. T. BARDOS, D. I. BECK, P. A.

/ILLINOIS UNIV./ DATE- MAY 1968

ARG-90259

Study of saturation magnetization, important in the investigation of the electronic structure of alloys, reveals the effect of aluminum on the saturation moments of iron-nickel alloys. The saturation magnetizations were extrapolated to the absolute zero of temperature for calculating average atomic moments.

B68-10177

SARAN FILM IS FIRE-RETARDANT IN OXYGEN ATMOSPHERE

GOODWIN, J. T. HERRERA, W. R. /SOUTHWEST RES. INST./ DATE- JUN. 1968

MSC-11604

Saran was tested for flammability as a wrapping on TFE-insulated electrical wire bundles in oxygen gas at pressures of 7.5 psia and 14.7 psia. It was found to be fire retardant or self-extinguishing in most instances.

# 03 MATERIALS (CHEMISTRY)

B68-10184

## STRESS-CORROSION CHARACTERISTICS OF ALUMINUM

CASTING ALLOY M-45

LOVOY, C. V. DATE- JUN. 1968 SEE ALSO

B65-10092 AND B67-10159

M-FS-14817

Evaluation of the stress-corrosion characteristics of aluminum alloy M-45 shows that the most favorable artificial aging cycle for this alloy, with regard to optimum strength and stress-corrosion resistance, appears to be 400 degrees F for 12 hours.

B68-10189

## REACTION STUDIED OF STEAM WITH NIOBIUM AND TANTALUM

KILPATRICK, M. LOTT, S. K. DATE- JUN. 1968

ARG-10051

Study reveals the kinetics of niobium and tantalum with steam at elevated temperatures to determine the suitability of high melting metals for fabrication of equipment for temperature steam environments. Niobium obeyed linear kinetics from 1050 degrees to 1500 degrees C but tantalum followed a parilinear raw law.

B68-10191

## EVALUATION OF METHODS FOR NONDESTRUCTIVE TESTING OF BRAZED JOINTS

KANNO, A. DATE- JUN. 1968 SEE ALSO

ANL-6924

ARG-90175

Evaluation of nondestructive methods of testing brazed joints reveals that ultrasonic testing is effective in the detection of nonbonds in diffusion bonded samples. Radiography provides excellent resolutions of void or inclusion defects, and the neutron radiographic technique shows particular advantage for brazing materials containing cadmium.

B68-10192

## WELDING OF COMMERCIAL BASE PLATES IS INVESTIGATED

CHEEVER, D. L. MARTIN, D. C. MISHLER, H. W.

MONROE, R. E. /BATTELLE MEM. INST./ DATE- JUN.

1968

M-FS-13649

Investigation of aluminum alloy welds reveals that the combinations of metallic elements with hydrogen are not capable of producing weld porosity themselves, rather they tend to increase the amount of porosity only in the presence of arc contamination by water vapor.

B68-10194

## SUSCEPTIBILITY OF IRRADIATED STEELS TO HYDROGEN EMBRITTLEMENT

ROSSIN, A. D. DATE- JUN. 1968 SEE ALSO

ANL-7266

ARG-10115

Investigation determined whether irradiated pressure-vessel steels 4340 and 212-B are susceptible to hydrogen embrittlement and to catastrophic failure. Hydrogen-charging conditions which completely embrittled 4340 steel had negligible effect on 212-B steel in tensile and delayed-failure tests.

B68-10195

## ELEMENTARY REVIEW OF ELECTRON MICROPROBE TECHNIQUES AND CORRECTION REQUIREMENTS

HART, R. K. DATE- JUN. 1968 SEE ALSO

ANL-7078

ARG-10062

Report contains requirements for correction of instrumented data on the chemical composition of a specimen, obtained by electron microprobe analysis. A condensed review of electron microprobe techniques is presented, including background material for obtaining X ray intensity data corrections and absorption, atomic number, and fluorescence corrections.

B68-10196

## FUNDAMENTAL ELECTRODE KINETICS

ELDER, J. P. DATE- JUN. 1968 SEE ALSO

ANL-7072

ARG-10067

Report presents the fundamentals of electrode kinetics and the methods used in evaluating the characteristic parameters of rapid-charge transfer processes at electrode-electrolyte interfaces. The concept of electrode kinetics is outlined, followed by the principles underlying the experimental techniques for the investigation of electrode kinetics.

B68-10197

## STUDY OF MECHANICAL PROPERTIES OF URANIUM COMPOUNDS

BEALS, R. J. DRAGEL, G. M. HANDWERK, J. H.

TUTTLE, C. R. DATE- JUN. 1968 SEE ALSO

ANL-7070

ARG-10074

Study determines the mechanical properties, including brittleness and ductility of several uranium compounds. These include uranium dioxide, uranium sulfide, and uranium phosphide.

B68-10198

## CRYSTAL STRUCTURE ANALYSIS OF INTERMETALLIC COMPOUNDS

CONNER, R. A., JR. DOWNEY, J. W. DWIGHT, A. E.

DATE- JUN. 1968

ARG-10092

Study concerns crystal structures and lattice parameters for a number of new intermetallic compounds. Crystal structure data have been collected on equiatomic compounds, formed between an element of the Sc, Ti, V, or Cr group and an element of the Co or Ni group. The data, obtained by conventional methods, are presented in an easily usable tabular form.

B68-10199

## STUDIES IN ZIRCONIUM OXIDATION

DRALEY, J. E. DRUNEN, C. J. LEVITAN, J. DATE-

JUN. 1968 SEE ALSO ANL-7252

ARG-10099

Study provides insight into the oxidation mechanism of zirconium by combining electrical measurements with oxidation data. The measurement of electrical potential across growing scale on zirconium and the determination of conventional weight-change oxidation data were carried out at 550, 700, and 800 degrees C.

B68-10200

## RESISTIVITY MEASUREMENTS OF NEUTRON-IRRADIATED PURE METALS AND AL-ZN ALLOYS

HORAK, J. A. DATE- JUN. 1968 SEE ALSO

ANL-7185

ARG-10108

Report presents resistivity measurements and their interpretation for neutron-irradiated pure metals and Al-Zn alloys. The influence of temperature, the role of point defects, and the aging behavior on resistivity are considered. The experimental procedures and results are discussed in detail.

B68-10201

## TECHNOLOGICAL SURVEY OF TELLURIUM AND ITS COMPOUNDS

STEINDLER, M. J. VISSERS, D. R. DATE- JUN. 1968

SEE ALSO ANL-7142

ARG-10119

Review includes data on the chemical and physical properties of tellurium, its oxides, and fluorides, pertinent to the process problem of handling fission product tellurium in fluoride form. The technology of tellurium handling in nonaqueous processing of nuclear fuels is also reviewed.

B68-10204

## MANGANESE-ALUMINA-CERAMIC GLASS ELIMINATES RIGID CONTROLS NECESSARY IN BONDING METALS TO CERAMICS

HOLLAR, E. L. DATE- JUN. 1968

SAN-10012

Matrix of manganese-alumino-silicate glass simplifies the processes of metallizing alumina ceramics. Because the manganese in the glass is preoxidized to the 2 plus state by firing in nitrogen, the ceramic can be metallized in dry hydrogen. Lengthening the firing time permits a



lower metallizing temperature.

B68-10212  
ION PLATING TECHNIQUE IMPROVES THIN FILM  
DEPOSITION  
MATTOX, D. M. DATE- JUN. 1968  
SAN-10006

Ion plating technique keeps the substrate surface clean until the film is deposited, allows extensive diffusion and chemical reaction, and joins insoluble or incompatible materials. The technique involves the deposition of ions on the substrate surface while it is being bombarded with inert gas ions.

B68-10214  
REDUCING BUBBLES IN GLASS COATINGS IMPROVES  
ELECTRICAL BREAKDOWN STRENGTH  
BANKS, B. DATE- JUN. 1968  
LEWIS-10278

Helium reduces bubbles in glass coatings of accelerator grids for ion thrusters. Fusing the coating in a helium atmosphere creates helium bubbles in the glass. In an argon atmosphere, entrapped helium diffuses out of the glass and the bubbles collapse. The resultant coating has a substantially enhanced electrical breakdown strength.

B68-10215  
GLASS COATED SINGLE GRID FOR CHARGED  
PARTICLE ACCELERATION  
BANKS, B. A. NAKANISHI, S. DATE- JUN. 1968  
LEWIS-10106

Glass coating is used on a single grid accelerator system for ion thrusters. The uniformly thin, smooth, dense, impervious glass coating has a high dielectric strength and is firmly bonded to the accelerator grid.

B68-10221  
LIQUID CRYSTAL CALIBRATOR  
COHEN, S. E. /LOCKHEED-GEORGIA CO./ DATE- JUN. 1968  
M-FS-14151

Calibration apparatus determines the operating temperature range /sensitivity/ of liquid crystals. The calibrator maintains a precisely controlled test surface temperature. It permits a measurement accuracy of plus or minus 0.5 degrees F and a sensitivity of plus or minus 0.15 degrees F.

B68-10251  
WELD MICROFISSURING IN INCONEL 718  
MINIMIZED BY MINOR ELEMENTS  
MORRISON, T. J. SHIRA, C. S. WEISENBERG, L. A.  
/N. AM. ROCKWELL CORP./ DATE- JUL. 1968  
SEE ALSO B67-10049  
M-FS-18185

Manganese, silicon, and magnesium markedly reduce the tendency of Inconel 718 to weld microfissuring. By combining a manganese, 0.20 percent by content, with silicon, greater than 0.25 percent content, or by adding 20 ppm of magnesium, the weld microfissuring decreased in the standard alloy.

B68-10253  
HIGH TEMPERATURE ALLOY  
FRANK, R. G. SEMMEL, J. W., JR. /GE/ DATE- JUL. 1968  
LEWIS-10377

Molybdenum is substituted for tungsten on an atomic basis in a cobalt-based alloy, S-1, thus enabling the alloy to be formed into various mill products, such as tubing and steels. The alloy is weldable, has good high temperature strength and is not subject to embrittlement produced by high temperature aging.

B68-10256  
GRAPHITE CLOTH FACILITATES VACUUM  
EVAPORATION OF SILICON MONOXIDE  
CARITHERS, M. D. /GEORGIA INST. OF TECH./ DATE- JUL. 1968  
M-FS-14764  
Woven graphite cloth facilitates the vacuum deposition of thin films of silicon monoxide on

substrate surfaces. The cloth serves both as a container and electric heating element for the silicon monoxide. It minimizes and prevents the silicon monoxide particle ejection, provides uniform heat distribution, and cools rapidly by radiation.

B68-10271  
PREPARATION OF SILVER-ACTIVATED ZINC SULFIDE  
THIN FILMS  
FELDMAN, C. SWINDELLS, F. E. /MELPAR/ DATE- AUG. 1968  
GSFC-10687

Silver improves luminescence and reduces contamination of zinc sulfide phosphors. The silver is added after the zinc sulfide phosphors are deposited in thin films by vapor evaporation, but before calcining, by immersion in a solution of silver salt.

B68-10274  
VISCOSITY AND DENSITY OF METHANOL/WATER  
MIXTURES AT LOW TEMPERATURES  
AUSTIN, J. G. KURATA, F. SWIFT, G. W. /KANSAS  
UNIV./ DATE- AUG. 1968  
M-FS-14991

Viscosity and density are measured at low temperatures for three methanol/water mixtures. Viscosity is determined by a modified falling cylinder method or a calibrated viscometer. Density is determined by the volume of each mixture contained in a calibrated glass cell placed in a constant-temperature bath.

B68-10278  
CHARACTERISTICS OF FLUIDIZED-PACKED BEDS  
GABOR, J. D. MECHAM, W. J. DATE- AUG. 1968  
SEE ALSO ANL-6859  
ARG-10049

Study of fluidized-packed bed includes investigation of heat transfer, solids-gas mixing, and elutriation characteristics. A fluidized-packed bed is a system involving the fluidization of small particles in the voids of a packed bed of larger nonfluidized particles.

B68-10279  
100 ANGSTROM NIOBIUM WIRE  
CLINE, H. E. ROSE, R. M. WULFF, J. /MIT/  
LEWIS-10128

Composite of fine niobium wires in copper is used to study the size and proximity effects of a superconductor in a normal matrix. The niobium rod was drawn to a 100 angstrom diameter wire on a copper tubing.

B68-10281  
STUDY OF BEHAVIOR OF STEROLS AT INTERFACES  
KLEIN, P. D. KNIGHT, J. C. SZCZEPANIK, P. A.  
DATE- AUG. 1968  
ARG-10085

Behavior of sterols and sterol acetates on various types of interfaces indicates that the function of a sterol depends upon a surface orientation and surface energy of the interface. Column-chromatographic techniques determine the retention volume of various sterols under standard conditions.

B68-10285  
PRE-WELD HEAT TREATMENT IMPROVES WELDS IN  
RENE 41  
PRAGER, M. /N. AM. ROCKWELL CORP./ DATE- AUG. 1968  
M-FS-18174

Cooling of Rene 41 prior to welding reduces the incidence of cracking during post-weld heat treatment. The microstructure formed during the slow cooling rate favors elevated temperature ductility. Some vestiges of this microstructure are apparently retained during welding and thus enhance strain-age crack resistance in air.

B68-10302  
EFFECTS OF SURFACE PREPARATION ON QUALITY  
OF ALUMINUM ALLOY WELDMENTS  
KIZER, D. SAPERSTEIN, Z. /IIT RES. INST./ DATE- AUG. 1968  
M-FS-13152

### 03 MATERIALS (CHEMISTRY)

Study of surface preparations and surface contamination effects on the welding of 2014 aluminum involves several methods of surface analysis to identify surface properties conducive to weld defects. These methods are radioactive evaporation, spectral reflectance mass spectroscopy, gas chromatography and spark emission spectroscopy.

B68-10334

MICROPROBE INVESTIGATION OF BRITTLE SEGREGATES IN ALUMINUM MIG AND TIG WELDS  
LARSEN, P. A. MILLER, E. L. /MCDONNELL DOUGLAS CORP./ DATE- SEP. 1968  
M-FS-14720

Quantitative microprobe analysis of segregated particles in aluminum MIG /Metal Inert Gas/ and TIG /Tungsten Inert Gas/ welds indicated that there were about ten different kinds of particles, corresponding to ten different intermetallic compounds. Differences between MIG and TIG welds related to the individual cooling rates of these welds.

B68-10340

APPLICATION OF THE SOLID LUBRICANT MOLYBDENUM DISULFIDE BY SPUTTERING  
PRZYBYSZEWSKI, J. SPALVINS, T. DATE- SEP. 1968  
LEWIS-10544

Molybdenum disulfide lubricant film is deposited on two substrates, niobium and nickel-chromium alloys, by means of physical direct-current sputtering. The sputtering system uses a three-electrode /triode/ geometry - a thermionic cathode, an anode, and the target, all enclosed in a vacuum chamber.

B68-10344

NICKEL BASE ALLOY WITH IMPROVED STRESS RUPTURE PROPERTIES  
COLLINS, H. E. QUIGG, R. J. /TRW/ DATE- SEP. 1968  
LEWIS-10283

Nickel base superalloy with improved stress rupture properties is used for jet aircraft turbine blades. This alloy is capable of maintaining its strength and its creep, oxidation, and thermal fatigue resistance at high temperature.

B68-10351

THERMAL CONDUCTIVITY AND DIELECTRIC CONSTANT OF SILICATE MATERIALS  
SIMON, I. WECHSLER, A. E. /ARTHUR D. LITTLE, INC./ DATE- SEP. 1968  
M-FS-14856

Report on the thermal conductivity and dielectric constant of nonmetallic materials evaluates the mechanisms of heat transfer in evacuated silicate powders and establishes the complex dielectric constant of these materials. Experimental measurements and results are related to postulated lunar surface materials.

B68-10355

EXPERIMENTS WITH CERAMIC COATINGS  
LYNN, E. K. ROLLINS, C. T. /N. AM. ROCKWELL CORP./ DATE- SEP. 1968  
M-FS-18150

Report describes the procedures and techniques used in the application of a ceramic coating and the evaluation of test parts through observation of the cracks that occur in this coating due to loading.

B68-10358

FIRE RETARDANT FOAMS DEVELOPED TO SUPPRESS FUEL FIRES  
FISH, R. GILWEE, W. J. PARKER, J. A. RICCITIELLO, S. R. DATE- SEP. 1968  
ARC-10098

Heat insulating polyurethane foam retards and suppresses fuel fires. Uniformly dispersed in the foam is a halogenated polymer capable of splitting off hydrogen halide upon heating and charring of the polyurethane.

B68-10360

FIBERGLASS-REINFORCED STRUCTURAL MATERIALS

FOR AEROSPACE APPLICATION

BARTLETT, D. H. /BOEING CO./  
DATE- SEP. 1968  
M-FS-14806

Evaluation of fiberglass-reinforced plastic materials concludes that fiberglass construction is lighter than aluminum alloy construction. Low thermal conductivity and strength makes the fiberglass material useful in cryogenic tank supports.

B68-10368

CONSOLIDATION AND FABRICATION TECHNIQUES FOR VANADIUM-20 W/O TITANIUM /TV-20/  
BURT, W. R. KARASEK, F. J. KRAMER, W. C. MAYFIELD, R. M. MC GOWAN, R. D. DATE- OCT. 1968  
SEE ALSO ANL-7127 AND ANL-6928  
ARG-10148

Tests of the mechanical properties, fuel compatibility, sodium corrosion and irradiation behavior were made for vanadium and vanadium alloy. Improved methods for consolidation and fabrication of bar, rod, sheet, and high-quality, small diameter, thin-wall tubing of vanadium-20 without titanium are reported.

B68-10369

TUNGSTEN FIBER-REINFORCED NICKEL SUPERALLOY  
PETRASEK, D. W. SIGNORELLI, R. A. WEETON, J. W. DATE- OCT. 1968 SEE ALSO NASA-TN-D-4787  
AND NASA-TM-X-52342  
LEWIS-10424

Tungsten fiber-reinforced nickel superalloy combines the strength of refractory metals with the oxidation resistance of superalloys. Knowledge of the relationship between fabrication technique, matrix compositions and fiber sizes minimized fiber-matrix reaction. Potential application includes high temperature turbine components.

B68-10373

PRODUCT IDENTIFICATION TECHNIQUES USED AS TRAINING AIDS FOR ANALYTICAL CHEMISTS  
GRILLO, J. P. DATE- OCT. 1968  
SAN-10025

Laboratory staff assistants are trained to use data and observations of routine product analyses performed by experienced analytical chemists when analyzing compounds for potential toxic hazards. Commercial products are used as examples in teaching the analytical approach to unknowns.

B68-10378

NONDESTRUCTIVE METHOD FOR MEASURING RESIDUAL STRESSES IN METALS, A CONCEPT  
SCHWEBEL, C. D. /BOEING CO./ DATE- OCT. 1968  
KSC-10237

Nondestructive direct measurement of residual surface stresses in metals can be made because metal under stress has a different electrochemical solution potential than in the unstressed condition. The method uses two matched electrolytic cells to cancel extraneous effects on the actual solution potential of the metal specimen.

B68-10380

NICKEL-BASE SUPERALLOY'S EXCELLENT PROPERTIES PROMOTE ITS SERVICE TO 2200 DEGREES F  
FRECHE, J. C. WATERS, W. J. DATE- OCT. 1968  
SEE ALSO NASA-TN-D-4390, B66-10222, AND B68-10094  
LEWIS-10355

Nickel base alloy with high strength, ductility, good impact and oxidation resistance, microstructural stability, workability potential, and the ability to show improved strength and ductility when directly solidified has recently been developed for high temperature applications.

B68-10381

HIGH-EMITTANCE COATINGS ON METAL SUBSTRATES  
EMANUELSON, R. C. LUOMA, W. L. WALEK, W. J. /PRATT AND WHITNEY AIRCRAFT CORP./ DATE- OCT. 1968  
LEWIS-10325

High-emittance coatings of iron, calcium, and

zirconium titanates thermally sprayed on stainless steel, columbium-1 percent zirconium, and beryllium substrates promote and control radiative heat transfer from the metal substrates. Adherence, compatibility and emittance stability at elevated temperature and high vacuum were evaluated.

B68-10385

ELECTROMOTIVE SERIES ESTABLISHED FOR METALS USED IN AEROSPACE TECHNOLOGY

KUSTER, C. A. /N. AM. ROCKWELL CORP./ DATE- OCT. 1968

M-FS-18327

Electromotive series has been established for approximately 130 commonly used aerospace metals. For most metals an initial potential and a service related potential was obtained.

B68-10390

IMPROVED PROCESS FOR EPITAXIAL DEPOSITION OF SILICON ON PREDIFFUSED SUBSTRATES

CLARKE, M. G. HALSOR, J. L. WORD, J. C. /WESTINGHOUSE ELEC. CORP./ DATE- OCT. 1968

M-FS-14910

Process for fabricating integrated circuits uniformly deposits silicon epitaxially on prediffused substrates without affecting the sublayer diffusion pattern. Two silicon deposits from different sources, and deposited at different temperatures, protect the sublayer pattern from the silicon tetrachloride reaction.

B68-10391

TRAINING MANUALS FOR NONDESTRUCTIVE TESTING USING MAGNETIC PARTICLES

INNOVATOR NOT GIVEN /GEN. DYN./CONVAIR/ DATE- OCT. 1968

M-FS-20187

Training manuals containing the fundamentals of nondestructive testing using magnetic particle as detection media are used by metal parts inspectors and quality assurance specialists. Magnetic particle testing involves magnetization of the test specimen, application of the magnetic particle and interpretation of the patterns formed.

B68-10392

CONTAMINATION CONTROL HANDBOOK

INNOVATOR NOT GIVEN /SANDIA CORP./ DATE- OCT. 1968

M-FS-20185

Contamination Control Handbook provides technical information on avoiding contamination of physical, chemical or biological systems or products. The book includes control methods for product design, gases and liquids, airborne and surface contamination, radiation, packaging, handling, storage and personnel.

B68-10394

NONDESTRUCTIVE TESTING OF BRAZED ROCKET ENGINE COMPONENTS

ADAMS, C. J. HAGEMAIER, D. J. MEYER, J. A. /N. AM. ROCKWELL CORP./ DATE- OCT. 1968

M-FS-18191

Report details study made of nondestructive radiographic, ultrasonic, thermographic, and leak test methods used to inspect and evaluate the quality of the various brazed joints in liquid-propellant rocket engine components and assemblies. Descriptions of some of the unique equipment and methods developed are included.

B68-10408

THE THERMODYNAMIC PROPERTIES OF THE WUSTITE PHASE ARE STUDIED

ACKERMAN, R. J. SANDFORD, R. W., JR. DATE- DEC. 1968 SEE ALSO ANL-7250

ARG-10200

Study of the precise location of the wustite phase boundaries and the dependence of the partial pressure of oxygen on the temperature and composition of the solid phase was made. From the pressure of oxygen, the temperature and the composition thermodynamic quantities can be determined.

B68-10409

THE PREPARATION, IDENTIFICATION AND PROPERTIES OF CHLOROPHYLL DERIVATIVES

KATZ, J. J. PENNINGTON, F. C. STRAIN, H. H. SVEC, W. A. DATE- DEC. 1968

ARG-10205

In the investigation of 10-hydroxy chlorophylls a and b novel techniques included modification of chromatography and the use of fully-deuterated compounds isolated from fully-deuterated autotrophic algae to determine the molecular structure of the chlorophylls.

B68-10414

TITANIUM-NITROGEN REACTION INVESTIGATED FOR APPLICATION TO GETTERING SYSTEMS

ARNTZEN, J. D. COLEMAN, L. F. KYLE, M. L. PIERCE, R. D. DATE- NOV. 1968 SEE ALSO

ANL-7167

ARG-10208

Titanium is one of several gettering materials available for removing nitrogen from inert gases. The reaction rate of titanium-metal sponge and nitrogen in argon-nitrogen mixtures was studied at 900 degrees C. The rate was found to depend upon the partial pressure of nitrogen in the gas phase. Mathematical relationships simulate titanium systems.

B68-10419

CHEMISTRY LABORATORY SAFETY MANUAL

AVAILABLE

ELSBROCK, R. G. DATE- NOV. 1968

SAN-10030

Chemistry laboratory safety manual outlines safe practices for handling hazardous chemicals and chemistry laboratory equipment. Included are discussions of chemical hazards relating to fire, health, explosion, safety equipment and procedures for certain laboratory techniques and manipulations involving glassware, vacuum equipment, acids, bases, and volatile solvents.

B68-10425

NITRIC ACID-ORGANIC MIXTURES SURVEYED FOR USE IN SEPARATION BY ANION EXCHANGE METHODS

BLOOMQUIST, C. A. A. FARIS, J. P. STEWART, D. C. DATE- NOV. 1968 SEE ALSO ANL-6999

ARG-10065

Column elution-spectrographic analysis technique compares certain solvents directly to the methanol system, using inert rare earths instead of actinides. Distribution ratios for americium between 90 percent solvent, 10 percent 5 M nitric acid and Dowex 1 nitrate form resin for a large group of organics miscible in water was determined.

B68-10433

AN ECONOMICAL METHOD FOR THE CONTINUOUS PRODUCTION OF IODINE-123

BLUE, J. W. SMITH, W. R. SODD, V. J. DATE- DEC. 1968

LEWIS-10518

Simple and inexpensive method produces iodine-123, in a conventional cyclotron. Tellurium-122, a stable isotope available in enrichments exceeding 95 percent, is held on a porous metal plate by a flowing stream of helium and bombarded with either alpha particles or helium-3.

B68-10454

HYDROGEN PEROXIDE ETCHING PROVES USEFUL FOR GERMANIUM

DAYAL, Y. /IIT RES. INST./ KAMPWIRTH, R. PRIMAK, W. DATE- DEC. 1968

ARG-10170

Influence of process variations in the etching of germanium with hydrogen peroxide has been studied, along with damage effects due to radiation. The work advances the knowledge of the etching process for germanium.

B68-10455

GRAIN-BOUNDARY MIGRATION IN KCL BICRYSTALS

GIBBON, C. F. DATE- DEC. 1968 SEE ALSO ANL-7232

ARG-10181

Boundary migration in melt-grown bicrystals of

#### 04 LIFE SCIENCES

KCl containing pure twist boundaries was investigated. The experiments involve the use of bicrystal specimens in the shape of right-triangular prisms with the boundary parallel to one side.

B68-10520

AMBIENT TEMPERATURE CATALYST FOR HYDROGEN IGNITION  
ROBERTS, R. W. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968  
LEWIS-10551

Low cost, ambient temperature catalyst for reacting hydrogen gas with air in a catalytic cell near the point of evolution at a controlled rate is announced.

B68-10522

METHOD FOR REMOVING SURFACE-DAMAGED LAYERS FROM NICKEL ALLOYS  
FAWLEY, R. W. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968  
M-FS-18151

Electrical discharge machining /EDM/ damaged layer can be effectively removed from Rene 41, Inconel 625, Inconel 718, and Monel K-500 by abrasive-grit blasting or electropolishing /at room temperature/ at a current density of 5A/inches squared in a water solution of phosphoric and sulfuric acids.

B68-10523

EVALUATION OF A FLUOROCARBON PLASTIC USED IN CRYOGENIC VALVE SEALS  
CIERNIAK, R. E. LIEB, J. H. MOWERS, R. E. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968  
M-FS-18189  
Effects of strain rate, temperature, crystallinity, and surface finish /smoothness/ on the tensile strength of a commercial chlorotrifluorethylene plastic /CTFE/ used for lipseals in very fast-acting liquid oxygen valves.

B68-10524

DISPENSING GRADUATE FOR BUTADIENE  
HIRSHFIELD, S. M. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968  
NPO-10070  
Graduate was designed for dispensing small volumes of liquid 1,3-butadiene or other volatile liquids which are in the gaseous state at room temperature.

B68-10526

PRECISE DOPING OF METALS BY SMALL GAS FLOWS  
BARRETT, C. A. DATE- NOV. 1968  
LEWIS-10444  
Simple method was developed for doping refractory metals with oxygen. The metal specimens are heated in a dynamic high-vacuum system. The system can be used for other oxygen absorption processes /such as low-pressure oxidation measurements/ and for gases other than oxygen.

B68-10527

GRAIN GROWTH INHIBITOR FOR POROUS TUNGSTEN MATERIALS  
TODD, H. H. /ELECTRO-OPT. SYSTEMS/ DATE- NOV. 1968  
LEWIS-10535  
Boron, either uncombined or combined with nitrogen or carbon added to tungsten powder prior to processing, effectively inhibits grain growth. The tungsten material is stable up to 1800 degrees C.

B68-10528

METHOD FOR CONTROLLING DENSITY AND PERMEABILITY OF SINTERED POWDERED METALS  
TODD, H. H. /ELECTRO-OPT. SYSTEMS/ DATE- NOV. 1968  
LEWIS-10393  
Improved, relatively low-cost method has been developed to produce porous metals with predetermined pore size, pore spacing, and density, utilizing powder-metal processes. The method uses angular not spherical tungsten powder.

B68-10532

MASS LOADING EFFECTS ON VIBRATED RING AND SHELL STRUCTURES  
LEE, S. Y. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968  
M-FS-14979  
Efficient methods for predicting the effects of attached masses on the vibration characteristics of ring and shell structures have been developed and substantiated with experimental data.

B68-10536

A RAPID STRESS-CORROSION TEST FOR ALUMINUM ALLOYS  
HELFRICH, W. J. /KAISER ALUMINUM AND CHEM. CORP./ DATE- DEC. 1968  
M-FS-20175  
Stressed alloy specimens are immersed in a salt-dichromate solution at 60 degrees C. Because of the minimal general corrosion of these alloys in this solution, stress corrosion failures are detected by low-power microscopic examination.

B68-10552

SIMULATED HAILSTONE FABRICATION AND USE IN TESTING WEATHERABILITY OF STRUCTURES  
STOLLER, F. W. DATE- DEC. 1968  
NPO-10783  
Equipment fabricates and uses simulated hailstones to test the weatherability of exposed structures. The equipment projects the hailstones at velocities experienced in hailstorms.

B68-10553

STRUCTURAL THERMAL-CONTROL COATINGS  
STOLLER, F. W. DATE- DEC. 1968  
NPO-10785  
Specifications have been formulated for application of thermal-control paints on large radar antenna structures exposed to solar radiation. The paint minimizes thermally induced mechanical deflections and glare of incident solar radiation.

B68-10557

SEPARATOR FOR ALKALINE BATTERIES  
HOYT, H. W. PFLUGER, H. L. /BORDEN CO./ DATE- DEC. 1968  
GSFC-10173  
Separator compositions have been tested as components of three-plate silver-zinc oxide cells in a standard cycling test. Six materials meet imposed requirements, giving cycling performance superior to cellophane.

B68-10561

WELD JOINT STRENGTH AND MECHANICAL PROPERTIES IN 2219-T81 ALUMINUM ALLOY  
KROPP, C. J. WITZELL, W. E. /GEN. DYN./CONVAIR/ DATE- DEC. 1968  
LEWIS-10479  
Plate and sheet were welded using automatic TIG /tungsten-inert gas/ weld techniques and manual repair weld techniques. Yield strength of 2219-T81 sheet and plate decreases significantly when welded.

B68-10568

STRESS-CORROSION-INDUCED PROPERTY CHANGES IN ALUMINUM ALLOYS  
BANKSTON, B. F. CLOTFELTER, W. N. DATE- DEC. 1968  
M-FS-20209  
Measurements of electrical conductivity, ultrasonic surface wave attenuation, and internal friction loss were made on aluminum alloys 7079-T6, 2219-T31, and 2219-T81 as a function of the onset of stress corrosion.

#### 04 LIFE SCIENCES

B68-10076

METABOLIC AND TOXICOLOGICAL EFFECTS OF WATER-SOLUBLE XENON COMPOUNDS ARE STUDIED  
FINKEL, A. J. KATZ, J. J. MILLER, C. E. DATE- APR. 1968

ARG-90239

Biological properties of water-soluble xenon compounds are the moderate toxicity of these substances, their rapid decomposition in the body, the speed with which the xenon appeared to be reduced to xenon gas, and the very rapid elimination of this gas from the body.

B68-10169

RADIATION EFFECTS ON BACTERIAL CELLS

POWERS, E. L. DATE- JUN. 1968

ARG-10064

Study reveals the physicochemical and biochemical mechanisms which alter or modify the effects of high-energy radiation on living cells. An in-depth discussion is presented emphasizing the importance of optimizing bacterial treatment with glycerol.

B68-10206

INFRARED VIEWING PERMITS HUMAN IRIS

RESPONSE STUDIES

SCHNASS, E. R. /N. AM. AVIATION/ DATE- JUN. 1968

ERC-10003

Infrared image converter tube and a filtered light source monitor and measure the eye of a subject during experimental task-work operations to obtain a more natural measurement of unimpeded iris response. The device permits observation in the near infrared region, with little stimulation to the eye except by normal ambient lighting.

B68-10231

VACUUM PROBE SAMPLER REMOVES MICRON-SIZED PARTICLES FROM SURFACES

WHITFIELD, W. J. DATE- JUL. 1968

SAN-10003

Vacuum probe sampler removes micron-sized particles from sensitive surfaces, without damage to the surface. The probe has a critical orifice to ensure an optimum airflow rate that disturbs the boundary layer of air and raises bacteria from the surface into the probe with the moving air stream.

B68-10320

EXPERIMENTAL STUDY AND EVALUATION OF RADIOPROTECTIVE DRUGS

SMITH, D. E. THOMSON, J. F. DATE- AUG. 1968

ARG-10196

Experimental study evaluates radioprotective drugs administered before exposure either orally or intravenously. Specifically studied are the sources of radiation, choice of radiation dose, choice of animals, administration of drugs, the toxicity of protective agents and types of protective drug.

B68-10324

FOOD PRODUCTS FOR SPACE APPLICATIONS

COPE, P. S. LARSON, R. W. /WHIRLPOOL CORP./ DATE- AUG. 1968

MSC-11697 MSC-11698 MSC-11699

Specially-prepared foodstuffs supply an astronaut with a diet containing his basic nutritional requirements in a form that is useful in his environment. Several edible coatings preserve foods and give \*\*loose\*\* foods form and firmness. These coatings aid in packaging and give the food \*\*slip\*\* for easy removal from the package.

B68-10366

STRATIFICATION OF CENTRIFUGED AMOEBA NUCLEI INVESTIGATED BY ELECTRON MICROSCOPY

BREYER, E. P. DANIELS, E. W. DATE- OCT. 1968

ARG-10161

Study establishes a relationship between radioresistance and the nucleolar stratification characteristics of various amoeba species. Two species of fresh water amoeba are studied with the electron microscope. The report discusses the nature of nucleolar layers and their possible relationship to the differences in radiosensitivity of the two amoeba species.

B68-10424

RATE CONSTANTS MEASURED FOR HYDRATED ELECTRON REACTIONS WITH PEPTIDES AND PROTEINS

BRAAMS, R. DATE- NOV. 1968

ARG-10195

Effects of ionizing radiation on the amino acids of proteins and the reactivity of the protonated amino group depends upon the pK subscript a of the group. Estimates of the rate constants for reactions involving the amino acid side chains are presented. These rate constants gave an approximate rate constant for three different protein molecules.

B68-10427

COMPOUND EQUATION DEVELOPED FOR POSTNATAL GROWTH OF BIRDS AND MAMMALS

LAIRD, A. K. DATE- NOV. 1968

ARG-10192

Compound growth equation was developed in which the rate of this linear growth process is regarded as proportional to the mass already attained at any instant by an underlying Gompertz process. This compound growth model was fitted to the growth data of a variety of birds and mammals of both sexes.

B68-10500

BIOLOGICAL ISOLATION GARMENT

SPROSS, F. R. DATE- NOV. 1968

MSC-12206

Biological Isolation Garment /BIG/ is a one piece loose fitting garment fabricated from a tightly woven, permeable, 100 percent-cotton fabric. Its headpiece, incorporates an integral oronasal respirator with 0.3-micron- particle filters, and a full width visor. All fabrication seams are sealed on the inside of the garment.

B68-10554

A MICROLAGOON TECHNIQUE FOR THE CULTURE OF MAMMALIAN CELLS

CONE, C. D., JR. PEDDREW, K. H. DATE- DEC. 1968

LANGLEY-10407

Technique obtains micropartitioning in a simple and reproducible manner by forming a field of tiny ponds or lagoons on the surface of a suitable culturing vessel. The technique allows free access of the common culture to all parts of the field.

## 05 MECHANICAL

B68-10004

DEVELOPMENT OF MECHANIZED ULTRASONIC SCANNING SYSTEM

EVANS, R. MAC DONALD, J. A. DATE- JAN. 1968

SEE ALSO NASA-TM-X-53598

M-FS-13638

Mechanized ultrasonic scanning system inspects the flaw content in the welds of space vehicle booster stages and propellant tanks. It is capable of scanning welds at speeds greater than 1 inch per second.

B68-10011

PNEUMATIC RAFT AUTOMATICALLY REFORMS AFTER RUPTURE OF BUOYANT MEMBER

RADNOFSKY, M. I. SHEWMAKE, G. A. DATE- JAN. 1968

MSC-11562

Unique, inflated, expandable socks are attached within the inflated chamber of a raft or a float in such a way that collapse of the chamber wall through damage, causes the adjacent sock to expand and restore the original configuration.

B68-10014

VENT AND RELIEF VALVE MAINTAINS LOW LEAKAGE RATE OVER BROAD TEMPERATURE RANGE

WEITENBECK, R. G. /PARKER AIRCRAFT CO./ DATE- JAN. 1968

M-FS-12807

Low leakage rate, large diameter vent and relief valve operates satisfactorily over a large temperature range by a design that accommodates waviness and distortions due to thermal gradients. It is based on a fixed sealing member having an inclined lapped surface to which a flexible flow gate conforms.

# 05 MECHANICAL

B68-10022

MECHANICAL SHIELDING REDUCES WELD SURFACE

CRACKING IN 6061 T6 ALUMINUM

HILL, J. E. /N. AM. AVIATION/ DATE- FEB. 1968

MSC-11494

Mechanical shield of high melting point material protects 6061-T6 aluminum welded with high frequency ac tungsten arc equipment. It is held in place around the weld bead area and eliminates heat check cracks.

B68-10024

LOCATING AND SEALING AIR LEAKS IN

MULTIROOMED BUILDINGS

BRITTON, J. M. /AEROJET-GEN. CORP./ DATE- FEB. 1968

1968

NUC-10304

Industrial, nontoxic smoke bombs are used in multiroomed buildings to locate and fill discovered leak areas with polyurethane foam. All obvious air escape routes are sealed and the room is then pressurized to a minimum of 0.1 inch water above the pressure of adjoining rooms.

B68-10026

PREDICTING FATIGUE LIFE OF METAL BELLOWES

DANIELS, C. M. /N. AM. AVIATION/ DATE- FEB. 1968

M-FS-14096

Classical method of presenting fatigue data in plots of alternating stress vs number of deflection cycles is applied to bellows formed of various metals, including corrosion-resistant steel, nickel alloys, and aluminum alloys. The expected life of a new bellows design can then be determined before fabrication and testing.

B68-10035

COMPUTER MAGNETIC TAPE REHABILITATION STUDY

BYRD, V. H. DATE- FEB. 1968

GSFC-10283

Study determines the most efficient method for magnetic tapes rehabilitation and storage for reuse. Investigated were the physical changes taking place in the tape during the rehabilitation process, measure of quality of the processed tapes, and the level of quality required to achieve sufficient yield.

B68-10036

TUBE DIMPLING TOOL ASSURES ACCURATE

DIP-BRAZED JOINTS

BEUYUKIAN, C. S. HEISMAN, R. M. /N. AM.

AVIATION/ DATE- FEB. 1968

MSC-533

Portable, hand-held dimpling tool assures accurate brazed joints between tubes of different diameters. Prior to brazing, the tool performs precise dimpling and nipple forming and also provides control and accurate measuring of the height of nipples and depth of dimples so formed.

B68-10037

SWING ARM CARRIER PROTECTS FLEXIBLE LINES

DURING TEST ITEM ROTATION

WARD, D. P. /N. AM. AVIATION/ DATE- FEB. 1968

MSC-11464

Swing arm carrier provides protection for flexible lines /fluid, electrical, RF/ connected to a test item that must be rotated through 360 degrees during test. It uses five gates riding on pivots to permit rotation of flexible lines through arcs of plus 180 degrees and minus 180 degrees.

B68-10038

CONCEPT TO STANDARDIZE SPACE VEHICLE

PIGGYBACK EXPERIMENT MODULES

CUMMINGS, A. DOWDY, W. MORITA, W. H. /N. AM.

AVIATION/ DATE- APR. 1968

M-FS-1697

Study investigates the use of spent launch vehicle stages and modules to support earth orbital operations and functions after successful completion of the primary mission. Emphasis is placed primarily on determination of those uses that afford the greatest utility with minimum possibility of degradation to the primary mission.

B68-10039

FUEL TRANSFER SYSTEM PERMITS RAPID

COUPLING

WEST, A. M. /LOCKHEED MISSILES AND SPACE CO./

DATE- FEB. 1968

M-FS-91326

Docking and fuel transfer system provides an efficient method for transferring fuel from a tanker to another vehicle. With this system, no triggering operation is required prior to docking, the support system can be rigidized by simply locking the rams of shock absorbers, and no separate fuel line coupling action is required.

B68-10040

HEAT-SHRINK PLASTIC TUBING SEALS JOINTS IN

GLASS TUBING

DEL DUCA, B. DOWNEY, A. DATE- FEB. 1968

LEWIS-10329

Small units of standard glass apparatus held together by short lengths of transparent heat-shrinkable polyolefin tubing. The tubing is shrunk over glass O-ring type connectors having O-rings but no lubricant.

B68-10041

IMPROVED TORCH INCREASES WELD QUALITY IN

REFRACTORY METALS

LESSMAN, G. G. SPRECCACE, R. /WESTINGHOUSE ELEC.

CORP./ DATE- FEB. 1968

LEWIS-324

Specially designed torch welds refractory metals in a vacuum purged, inert gas backfilled welding chamber /weld box/ with practically zero contamination resulting from its use. Included in the torch design is a radiation shield to protect the operators hands when welding at high amperages.

B68-10042

SUSPENDED CHAINS DAMP WIND-INDUCED

OSCILLATIONS OF TALL FLEXIBLE STRUCTURES

REED, W. H., III DATE- FEB. 1968

LANGLEY-10193

Hanging-chain system, which is a form of impact damper, suppresses wind-induced bending oscillations of tall cylindrical antenna masts. A cluster of chains enclosed in a neoprene shroud is suspended inside the tip of the antenna mast, forming a simple method of damping structural vibrations.

B68-10047

FAST METHOD FOR OBTAINING SCALE DIMENSIONS

ON TAPE-CONTROLLED MILLING MACHINE

THOMPSON, L. J. /N. AM. AVIATION/ DATE- MAY 1968

MSC-11609

Calculator obtains the Rail and Z Scale dimensions on the tape-controlled Sundstrand milling machine. It provides computer with depth information required to process numerical control programs which, in turn, provide the tapes for operation of N/C milling machines.

B68-10052

MULTICHANNEL WIREWAY ADAPTER BOX

BLAKE, W. /N. AM. AVIATION/ DATE- MAR. 1968

MSC-90645

Adapter box provides continuous separation of different electrical leads at points where their runs must intersect. Thus, multichannel conduits of standard commercial design may be used in a manner that prevents crossing of wire leads carrying different currents where the runs intersect and change direction.

B68-10053

REMOTELY INSTALLED PIPE PLUG PROVIDES

EFFECTIVE SEAL IN HAZARDOUS ENVIRONMENT

CLIFTON, R. P. /AEROJET-GEN. CORP./ DATE- MAR. 1968

1968

NUC-10303

Pipe plug for remote installation in an open-ended pipe used in a hazardous environment provides a gastight seal by expanding a rubber seal against the inside surface of the pipe opening, with mechanical clamps contacting the pipe flange for positive retention of the plug.

B68-10057

SYNCHRONIZED CIRCUIT IMPROVES ACCURACY OF

## FLUID TRANSFER MEASUREMENTS

VENDL, C. J. /N. AM. AVIATION/ DATE- MAR. 1968  
MSC-11167

Shut-off valve at the destination of a transferred fluid, improves the accuracy of measurements determining the quantity of liquid transferred from a storage source to a remote location. By synchronizing this valve with the measuring device /totalizer/, the inaccuracies resulting from unfilled transfer lines can be reduced.

B68-10064

## FLEXIBLE RING BAFFLES FOR DAMPING LIQUID

SLOSH

BROOKS, G. W. STEPHENS, D. G. DATE- FEB. 1968  
SEE ALSO NASA-TN-D-3878

LANGLEY-90194

Slosh damping, obtained through the use of small, less massive, flexible baffles, provides a relatively lightweight system for damping the motions of liquid propellants in launch vehicles, missiles, and other tankage systems.

B68-10072

## CLAMP FOR DETONATING FUZE

HOLDERMAN, E. J. /DOUGLAS AIRCRAFT CO./ DATE- MAR. 1968

M-FS-13399

Quick acting clamp provides physical support for a closely confined detonating fuse in an application requiring removal and replacement at frequent intervals during test. It can be designed with a base of any required strength and configuration to permit the insertion of an object.

B68-10075

## MAINTAINABILITY METHODOLOGY AND MAINTENANCE ANALYSES

BEACH, R. E. ELLIS, G. F. GRALOW, F. H.  
HORSEMAN, J. J. KOZLOWSKI, F. J. /BOEING CO./ DATE- MAR. 1968

M-FS-14134 M-FS-14221

Initial approach in performing maintainability studies involves detailed description of methodology used. Maintenance analyses are formulated for system, subsystem, and component levels. These are performed to ensure that complete, integrated, logistics system support elements are identified.

B68-10078

## DEVICE DAMPS FLUID PRESSURE OSCILLATIONS IN VENT VALVE

NEIN, H. J. DATE- MAY 1968

M-FS-13290

Device, containing a tuned series arrangement of two plenum chambers and two orifices, damps high pressure fluid oscillations in a vent valve. Used in conjunction with vent valves, it relieves gas pressure that develops in liquid hydrogen and liquid oxygen tanks used on a space vehicle.

B68-10080

## NUMERICAL CONTROL MACHINE DATA MANUAL

MACKEY, R. T., SR. /N. AM. ROCKWELL CORP./ DATE- MAY 1968

M-FS-14342

Numerical Control Machine Data Manual provides programmers with specific information for various types and sizes of numerical control machine tools and auxiliary equipment.

B68-10082

## DEPLOYABLE LATTICE COLUMN

MAUCH, H. R. /ASTRO RES. CORP./ DATE- MAY 1968

NPO-10228

Lattice column, made up of many individually collapsible sections connected in tandem, rapidly raises measuring instruments to a level appreciably above that where data is to be recorded and evaluated. The column may be collapsed by collapsing each section in sequence and is deployed by extending each section in sequence.

B68-10099

## SYSTEM FOR MEASURING ROUNDNESS AND CONCENTRICITY OF LARGE TANKS

MELTON, R. E. /SPACO/ DATE- MAY 1968

SEE ALSO B67-10214

M-FS-13362

Equipment measures the roundness and concentricity of large, massive tanks. The equipment includes a 34-foot rotary table, a variable reluctance displacement transducer, an electronics console, a digital computer, and a 5-foot plotter used for final data display.

B68-10107

## ELECTROFORMED SCREENS WITH UNIFORM HOLE

SIZE

SCHAEER, G. R. /BATTELLE MEM. INST./ DATE- APR. 1968

LEWIS-10117

Efficient method electroforms fine-mesh nickel screens, or plaques, with uniform hole size and accurate spacing between holes. An electroformed nickel mandrel has nonconducting silicone rubber projections that duplicate the desired hole size and shape in the finished nickel screen.

B68-10110

## VISCOUS DAMPER

DEAN, W. C. /UNITED AIRCRAFT CORP./ DATE- APR. 1968

MSC-12072

Damping device exhibiting no hysteresis effect and capable of preload is used in place of a preload spring in an aneroid bellows to provide viscous damping. It operates about the action of a pressure sensing outer bellows attached to an active header above and a static header below.

B68-10111

## SLEEVED DAMPER LIMITS SPRING SURGING

DEAN, W. C. /UNITED AIRCRAFT CORP./ DATE- APR. 1968

MSC-12071

Damping device limits spring surging in delicate instrumentation subjected to shock loading to tolerable limits. The device consists of a spiral formed plastic member interleaved between the spring coils in the same helix configuration.

B68-10115

## METHOD FOR REINFORCING TUBING JOINTS

KINZLER, J. LEE, W. S. DATE- APR. 1968

MSC-11108

Joint repair technique uses a longitudinally split aluminum shield over the joint ferrule and immediately adjacent tubing to reseal or reinforce leaking or weak joints in small tubing. Epoxy resin coating on inside surfaces of the two shield halves provides a tightly sealed bond between shield and tubing.

B68-10117

## TOGGLE OPERATED DOUBLE LATCH

BARBOUR, R. T. NECKER, D. E. /N. AM. AVIATION/ DATE- APR. 1968

MSC-11377

Double hook latch provides preloading and support capability up to 80,000 pounds and opens self-energizingly when restraint linkage is released. It incorporates a double hook latch held closed by a toggle linkage attached to a flexible cable rigged in tension.

B68-10120

## PRESSURE VARIABLE ORIFICE FOR HYDRAULIC CONTROL VALVE

AMMERMAN, R. L. /N. AM. AVIATION/ DATE- APR. 1968

MSC-11323

Hydraulic valve absorbs impact energy generated in docking or joining of two large bodies by controlling energy release to avoid jarring shock. The area of exit porting presented to the hydraulic control fluid is directly proportional to the pressure acting on the fluid.

B68-10122

## MEASURING THERMAL EXPANSION OF MULTIPLE SPECIMENS AT HIGH TEMPERATURE

GAAL, P. S. /WESTINGHOUSE ASTRONUCL. LAB./ DATE- MAY 1968

NUC-10153

Furnace capable of heating 10 specimens to a

uniform temperature simultaneously, aids in the measuring of the thermal expansion of each specimen. The specimens are measured with a telescope unit consisting of two microtelescopes. Overall accuracy of the system is estimated to be plus or minus 2 percent at 2000 degrees C.

B68-10123

## IMPROVED ACTIVE VIBRATION ISOLATOR

DIXON, G. V. LEATHERWOOD, J. D. STEPHENS, D. G.

DATE- APR. 1968

LANGLEY-10106

Active vibration isolator simultaneously isolates a flexible structure or payload from disturbances, attenuates the response of a flexible structure to transient disturbances, and maintains the equilibrium position of the payload within predetermined limits over a wide range of steady loads and accelerators.

B68-10125

## VACUUM-JACKETED TRANSFER LINE INSTALLATION TECHNIQUE

BOWERS, W. M. /N. AM. ROCKWELL CORP./ DATE- APR. 1968

M-FS-14496

Rolling-type spacers in the form of steel balls retained in appropriate sleeves affixed at intervals to the exterior of the transfer line facilitate the installation of a vacuum-jacketed line. They act as standoffs to position the transfer line concentrically within the vacuum jacket line.

B68-10132

## IMPROVED MOLDING PROCESS ENSURES PLASTIC PARTS OF HIGHER TENSILE STRENGTH

HEIER, W. C. DATE- APR. 1968

LANGLEY-10033

Single molding process ensures that plastic parts /of a given mechanical design/ produced from a conventional thermosetting molding compound will have a maximum tensile strength. The process can also be used for other thermosetting compounds to produce parts with improved physical properties.

B68-10134

## SHALLOW GROOVES IN JOURNAL IMPROVE AIR BEARING PERFORMANCE

ANDERSON, W. J. CUNNINGHAM, R. E. FLEMING, D. P.

DATE- APR. 1968

LEWIS-10396

Bearing designs, which shape the surface to create artificial fluid-film wedges in the absence of any applied radial load, generate radial restoring forces to keep journals from whirling. Helical- or herringbone-grooved journals or rotors show most promise of stable operation, with no sacrifice in load capacity.

B68-10161

## ROLL DIFFUSION BONDING OF TITANIUM ALLOY PANELS

BENNETT, J. DE WITT, T. E. JONES, A. G.

KOELLER, F. MUSER, C. /N. AM. ROCKWELL CORP./

DATE- MAY 1968

M-FS-14743

Roll diffusion bonding technique is used for fabricating T-stiffened panel assemblies from titanium alloy. The single unit fabrication exhibits excellent strength characteristics under tensile and compressive loads. This program is applied to structures in which weight/strength ratio and integral construction are important considerations.

B68-10162

## ASBESTOS AND INCONEL COMBINED TO FORM

## HOT-GAS SEAL

WOOSTER, C. W., JR. /N. AM. AVIATION/ DATE- MAY

1968

M-FS-14004

Hot-gas seal prevents warpage tendencies in large flange joints exposed to high temperatures, such as those present in large space vehicle engine exhausts. Two Inconel wire mesh cores are held in place by an asbestos cloth cover that acts as a spacer to form the seal.

B68-10165

## BEARINGS USE DRY SELF-LUBRICATING CAGE MATERIALS

ANDERSON, W. J. GLENN, D. C. SCRIBBE, H. W.

DATE- MAY 1968

LEWIS-10432

Rolling element bearings in spacecraft mechanical systems use solid lubricant composites of polytetrafluoroethylene in the bearing cage which functions as the lubricant reservoir. The cage spaces the rolling elements equally and provides the lubricant at the bearing load-carrying surface.

B68-10168

## BALLAST BARGE CONCEPT FOR UNDERWATER STRUCTURES

PAYNE, V. E. DATE- JUN. 1968

KSC-10196

Ballast barge for underwater structure consists of a reinforced concrete structure partitioned into watertight compartments. The barge structure includes a 3-way venting valve, a compressed air manifold, a master valve for connecting the manifold to an air line, and an open port in each compartment for admitting and expelling sea water.

B68-10176

## HIGH-TEMPERATURE BEARING-CAGE MATERIALS

ANDERSON, W. J. ZARETSKY, E. V. DATE- JUN. 1968

LEWIS-10403

Evaluation tests conducted at temperatures of 500 and 700 degrees F reveal that S-Monel and AISI M-1 steel are suitable as high temperature cage materials for precision bearings. The area of the wear scar in the cage pocket that developed during the test was used as the measure of wear.

B68-10180

## SQUEEZE-FILM GAS BEARING TECHNOLOGY

PAN, C. H. T. /MECH. TECHNOL./ DATE- JUN. 1968

SEE ALSO B66-10226

M-FS-14821

Squeeze-film bearing is studied to develop a low-friction suspension for the output-axis gimbal of a single-degree-of-freedom gyroscope. Included are a review of pertinent literature, the theory of squeeze-film lubrication, and design elements.

B68-10209

## MAGNETICALLY CONTROLLED TORQUE WRENCH PREVENTS OVERTORQUING

ROHRER, J. A. DATE- JUN. 1968

SAN-10002

Magnetically controlled torque wrench produces the required torque values accurately, and prevents overtorquing. The force between a magnet and a soft iron bar on the arms of the wrench constitutes a predetermined maximum torque that cannot be exceeded. So long as the magnetic flux remain constant, the torque remains the same.

B68-10211

## PROPOSED GAS GENERATION ASSEMBLY WOULD RECOVER DEEPLY SUBMERGED OBJECTS

SPRAGUE, C. W. DATE- JUN. 1968

SAN-10007

Gas generation system, used for recovery of submerged objects, generates hydrogen gas by the reaction of sodium with sea water. The assembly consists of flooded flotation tanks cabled together, equipped with relief valves to equalize pressure as the array ascends and hydrostatic pressure diminishes, and carrying remotely activated welding units.

B68-10219

## PACKAGING CRITERIA FOR TRANSPORTATION AND HANDLING SHOCK AND VIBRATION

DATE- JUN. 1968

M-FS-13007

Information compiled on the shock and vibration environment encountered by items and equipment during shipment shows the distribution of drop heights for particular packages, distribution systems, and handling operations. Applications of the data to typical package design problems are discussed.



B68-10222

# ASSEMBLY, CHECKOUT, AND OPERATION OPTIMIZATION ANALYSIS TECHNIQUE FOR COMPLEX SYSTEMS

/INNOVATOR NOT GIVEN/ DATE- JUN. 1968  
M-FS-14105 M-FS-14132 M-FS-14137

Computerized simulation model of a launch vehicle/ground support equipment system optimizes assembly, checkout, and operation of the system. The model is used to determine performance parameters in three phases or modes - /1/ systems optimization techniques, /2/ operation analysis methodology, and /3/ systems effectiveness analysis technique.

B68-10225

# LASER SYSTEM USED FOR DYNAMIC BALANCING OF GYROS

POPICK, H. ROBERTS, D. L. /KORAD CORP./ DATE- JUN. 1968  
M-FS-12218

System using a pulsed ruby laser balances or trims gyro rotors spinning at speeds of up to 24,000 rpm. It is designed to detect high spots on the spinning rotor and to focus a precisely timed laser beam on these detected spots.

B68-10229

# EFFECT OF SURFACE IRREGULARITIES ON BELLOWS FATIGUE LIFE

SCHMIDT, E. H. SHEAFFER, E. F. TURNER, J. D. ZEIMER, R. L. /N. AM. ROCKWELL CORP./ DATE- JUL. 1968

M-FS-14480

Report presents test data on the bending fatigue life of notched sheet specimens. The influence of a surface irregularity on the fatigue life of a metal bellows is evaluated, with emphasis on accidental defects in ducting bellows which are impossible to avoid short of completely eliminating human contact.

B68-10235

# TUBE SWAGING DEVICE USES EXPLOSIVE FORCE

MC SMITH, D. G. DATE- JUL. 1968

LANGLEY-10092

Tool joins a sleeve to a tube by explosive swaging, thus providing a leakproof, lightweight, and strong assembly. No new or different material is used in this method and therefore the thermal and galvanic properties are maintained.

B68-10237

# DUAL RATE PRESSURE RELIEF VALVE

STEENEKEN, J. /GARRETT CORP./ DATE- JUL. 1968

MSC-11606

Pressure relief valve vents at a slow bleed rate at one pressure level and at a higher bleed rate at a higher pressure level. The valve housing contains a sleeve, inlet port, outlet port, an orifice, a ball and seat arrangement, and a belleville spring diaphragm.

B68-10239

# MANUAL OF INDUSTRIAL DIAMONDS PLUS DRESSING AND GRINDING CRITERIA FOR MACHINING SUPERALLOYS

CARR, W. L. /N. AM. ROCKWELL CORP./ DATE- JUL. 1968

M-FS-14582

Manual combines the important and controlling factors for the proper selection and use of diamond stones for cutting and dressing grinding wheels. This manual is a compilation of empirical data and incorporates an original companion treatise on the physical descriptions of the diamond stones, their grading, and their applications.

B68-10247

# DYNAMICALLY STABLE CHECK VALVE CONCEPT FOR WIDE FLOW RANGE

ABSALON, J. G. /N. AM. ROCKWELL CORP./ DATE- JUL. 1968

M-FS-14579

Poppet-type check valve design accommodates a wide flow range without the usual chatter problem at low flow conditions. This pressure isolation check valve is proposed for the J-2 rocket

pneumatic package.

B68-10248

# TENSILE TESTING GRIPS ENSURE UNIFORM LOADING OF BIMETAL TUBING SPECIMENS

DRISCOL, S. D. HUNT, V. /AEROJET-GEN. CORP./ DATE- SEP. 1968

LEWIS-10267

Tensile testing grip uniformly distributes stresses to the internal and external tube of bimetal tubing specimens. The grip is comprised of a slotted external tube grip, a slotted internal tube grip, a machine bolt and nut, an internal grip expansion cone, and an external grip compression nut.

B68-10249

# HIGH-TEMPERATURE BEARING LUBRICANTS

ANDERSON, W. J. PARKER, R. J. ZARETSKY, E. V. DATE- SEP. 1968

LEWIS-10408

Synthetic paraffinic oil lubricates ball bearings at temperatures in the 600 degrees F range. The lubricant contains antiwear and antifoam additives, is thermally stable in the high temperature range, but requires protection from oxygen.

B68-10250

# QUICK-ATTACH CLAMP

VANO, A. E. DATE- JUL. 1968

XFR-05421

Clamp of the slideable jaw type can be applied to moving lines such as cables or ropes. The clamp has a trigger-operated jaw that can be attached to a redrop parachute on a moving tow cable. The trigger mechanism maintains the jaws retracted in the housing until they are released for clamping.

B68-10257

# INSPECTION CRITERIA ENSURE QUALITY CONTROL OF PARALLEL GAP SOLDERING

BURKA, J. A. /SPACO, INC./ DATE- JUL. 1968

M-FS-14530

Investigation of parallel gap soldering of electrical leads resulted in recommendation on material preparation, equipment, process control, and visual inspection criteria to ensure reliable solder joints. The recommendations will minimize problems in heat-dwell time, amount of solder, bridging conductors, and damage of circuitry.

B68-10261

# DYNAMIC-RESERVOIR LUBRICATING DEVICE

FICKEN, W. H. SCHULIEN, H. E. /BENDIX CORP./ DATE- JUL. 1968

M-FS-14652

Dynamic-reservoir lubricating device supplies controlled amounts of lubricating oil to ball bearings during operation of the bearings. The dynamic reservoir lubricating device includes a rotating reservoir nut, a hollow cylinder filled with lubricating oil, flow restrictors and a ball bearing retainer.

B68-10266

# SHOCK-ABSORBING CASTER WHEEL IS SIMPLE AND COMPACT

KINDLEY, R. J. DATE- JUL. 1968

SAN-10019

Compact shock-absorbing caster wheel mitigates or absorbs shock by a compressible tire which deforms into a cavity between its inner edge and the wheel hub. A tee-shaped annular ring embedded in the tire distributes loads more uniformly throughout both wheel and tire.

B68-10270

# SPIRAL-GROOVED SHAFT SEALS SUBSTANTIALLY REDUCE LEAKAGE AND WEAR

ALLEN, G. P. JOHNSON, R. L. LUDWIG, L. P. STROM, T. N. DATE- JUL. 1968

LEWIS-10397

Rotating shaft seals used in space power systems have spiral grooves in one or both of the opposing seal faces. These grooves induce a pumping action which displaces the intervening fluid radially inward toward the shaft and counters the centrifugal forces which tend to displace the

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fluid outward.

B68-10277  
THERMAL PROTECTIVE VISOR FOR ENTERING  
HIGH TEMPERATURE AREAS  
BURGETT, F. A. DATE- AUG. 1968  
MSC-10285

Chamber observer suit visor protects the eyes and ears of the wearer while he is performing rescue operations during a fire. The visor is a simple curved sandwich of selected glass plates, gold coated polyester plastic film, and a dead air space, all mounted in an aluminum frame.

B68-10284  
FABRICATION TECHNIQUES DEVELOPED FOR SMALL-  
DIAMETER, THIN-WALL TUNGSTEN AND TUNGSTEN  
ALLOY TUBING  
BRILLHART, D. C. BURT, W. R. KARASEK, F. J.  
MAYFIELD, R. M. DATE- AUG. 1968 SEE ALSO  
ANL-7151  
ARG-10100

Report describes methods for the fabrication of tungsten and tungsten alloys into small- diameter, thin-wall tubing of nuclear quality. The tungsten, or tungsten alloy tube-blanks are produced by double extrusion. Plug- drawing has emerged as an excellent secondary fabrication technique for the reduction of the overall tube dimensions.

B68-10286  
BETWEEN-BEARING SHAFT SEAL, A CONCEPT  
FURST, R. B. /N. AM. ROCKWELL CORP./ DATE- AUG.  
1968  
M-FS-18179

Placing the shaft seals, in an oxidizer pump, between the pump bearings, reduces the shaft overhang length and overall turbopump length. This arrangement of the components in the pump removes the seals from the hot turbine region.

B68-10288  
ADVANCES IN LIGHT-GAS GUN TECHNOLOGY  
COWAN, P. L. MURPHY, J. R. /COMPUTING DEVICES OF  
CANADA/ DATE- AUG. 1968  
M-FS-14270

Constant-area accelerator used with light-gas guns increases the velocity of accelerating projectiles. A disposable accelerator on the muzzle of the gun uses the energy and momentum of a primary projectile, launched by the gun, to achieve high velocities of a light secondary projectile accelerated from rest in the accelerator.

B68-10295  
VENTURI METER WITH SEPARABLE DIFFUSER  
DUDZINSKI, T. J. JOHNSON, R. C. KRAUSE, L. N.  
DATE- AUG. 1968  
LEWIS-10483

The diffuser and nozzle of venturi meters are made as separate pieces for easier fabrication. Venturi meter efficiency is affected by the diffuser inlet diameter being greater than two percent larger than the throat diameter, by Reynolds number and by mach number.

B68-10297  
PREPARING ROCK POWDER SPECIMENS OF  
CONTROLLED SIZE DISTRIBUTION  
BLUM, P. /NORTON RES. CORP./ DATE- AUG. 1968  
NPO-10007

Apparatus produces rock powder specimens of the size distribution needed in geological sampling. By cutting grooves in the surface of the rock sample and then by milling these shallow, parallel ridges, the powder specimen is produced. Particle size distribution is controlled by changing the height and width of ridges.

B68-10299  
HIGH-TORQUE POWER WRENCH, A CONCEPT  
COX, E. F. /N. AM. ROCKWELL CORP./ DATE- AUG.  
1968  
M-FS-18194

High-torque power wrench is small enough to be handled by one or two men yet has sufficient torque to remove 1-1/2- to 4-inch nuts from

high-pressure tanks and valves. The action can be made automatic by use of solenoid-operated valves and suitable switches.

B68-10300  
CONCEPTUAL HERMETICALLY SEALED ELBOW  
ACTUATOR  
WUENSCHER, H. F. DATE- AUG. 1968  
M-FS-14710

Electrically or hydraulically powered, hermetically sealed angular or rotary actuator deflects mechanical members over a range of plus or minus 180 degrees. The actuator design provides incremental flexures which keep the local deflection rate within elastic limits.

B68-10318  
COMPRESSIBLE SLEEVE PROVIDES AUTOMATIC  
CENTERING FOR GRINDING OR TURNING OF  
CYLINDERS  
ROHRER, J. A. DATE- AUG. 1968  
SAN-10021

Elastomeric sleeve supported on a threaded mandrel automatically centers cylindrical castings for grinding or turning. By expanding the diameter of the sleeve with pressure against the ends, the casting becomes rigidly supported and the surfacing operation can be completed.

B68-10331  
ELECTRON BEAM SELECTIVELY SEALS POROUS METAL  
FILTERS  
SNYDER, J. A. /HUGHES AIRCRAFT CO./ TULISIAK, G.  
DATE- SEP. 1968  
LEWIS-10162

Electron beam welding selectively seals the outer surfaces of porous metal filters and impedances used in fluid flow systems. The outer surface can be sealed by melting a thin outer layer of the porous material with an electron beam so that the melted material fills all surface pores.

B68-10332  
DUAL WIRE WELD FEED PROPORTIONER  
NUGENT, R. E. /N. AM. ROCKWELL CORP./ DATE- SEP.  
1968  
M-FS-18037

Dual feed mechanism enables proportioning of two different weld feed wires during automated TIG welding to produce a weld alloy deposit of the desired composition. The wires are fed into the weld simultaneously. The relative feed rates of the wires and the wire diameters determine the weld deposit composition.

B68-10338  
TWO-FLUID, IMPINGING-SHEET INJECTOR  
RIEBLING, R. W. DATE- SEP. 1968  
NPO-10547

Two-fluid, impinging-sheet propellant injector reduces the severe erosion found to occur when ejector elements are directly exposed during throttling without the benefits of a cooling flow of the propellant liquids. It greatly improves combustion efficiency by venting the secondary stream of combustion gases generated by backspray reaction.

B68-10343  
X-RAY FILM HOLDER PERMITS SINGLE  
CONTINUOUS PICTURE OF TUBING JOINT  
DIAMOND, J. W. HUNT, V. MIKESELL, C.  
/AEROJET-GEN. CORP./ DATE- SEP. 1968  
LEWIS-10382

X ray technique produces a clear continuous picture of a welded brazed tubing joint on a single film with one exposure. A stationary X ray source located in the plane of the joint to be inspected, a means of rotating the tube, and a unique internal film holder and positioning fixture are used.

B68-10352  
MACHINING TECHNIQUE PREVENTS UNDERCUTTING  
IN TENSILE SPECIMENS  
MOSCATER, R. E. ROYSTER, D. M. DATE- SEP. 1968  
LANGLEY-10281

Machining technique prevents undercutting at the test section in tensile specimens when machining

the four corners of the reduced section. Made with a gradual taper in the test section, the width of the center of the tensile specimen is less than the width at the four corners of the reduced section.

**B68-10353**  
SHOCK AND VIBRATION RESPONSE OF MULTISTAGE STRUCTURE

LEE, S. Y. LIYEOS, J. G. TANG, S. S. /N. AM. ROCKWELL CORP./ DATE- SEP. 1968  
M-FS-14972

Study of the shock and vibration response of a multistage structure employed analytically, lumped-mass, continuous-beam, multimode, and matrix-iteration methods. The study was made on the load paths, transmissibility, and attenuation properties along a longitudinal axis of a long, slender structure with increasing degree of complexity.

**B68-10359**  
REMOTELY OPERATED GRIPPER PROVIDES VERTICAL CONTROL ROD MOVEMENT

HUTTER, E. KOCH, L. J. DATE- SEP. 1968  
ARG-10160

Remote actuation of a gripper shaft affects vertical engagement between a drive shaft and control rod. A secondary function of the gripper is to provide remote indication of positive completion of the gripping or ungripping operation.

**B68-10371**  
VERSATILE IMPACT HAND TOOL

HODIL, E. R. /OLIN WINCHESTER/ DATE- OCT. 1968  
M-FS-20140

Improved cartridge-actuated impact hand tool includes a common power head and four attachments to punch holes, drive forced entry fasteners, hammer, and shear. The attachments are self-contained and easily fitted to the power head assembly.

**B68-10372**  
IMPROVED ELECTROMECHANICAL MASTER--SLAVE MANIPULATOR

FORSTER, G. GOERTZ, R. GRIMSON, J. MINGESZ, D. POTTS, C. DATE- OCT. 1968  
ARG-10027

Electric master-slave manipulator uses force multiplication and allows the operator to remotely control the slave arm. Both the master and slave arms execute seven distinct motions by a specially designed force-reflecting servo having a one to one correspondence between the motion at the master and slave.

**B68-10383**  
EFFECTS OF HIGH FREQUENCY CURRENT IN WELDING ALUMINUM ALLOY 6061

FISH, R. E. /N. AM. ROCKWELL CORP./ DATE- OCT. 1968  
M-FS-18337

Uncontrolled high frequency current causes cracking in the heat-affected zone of aluminum alloy 6061 weldments during tungsten inert gas arc welding. Cracking developed when an improperly adjusted superimposed high frequency current was agitating the semimolten metal in the areas of grain boundary.

**B68-10387**  
MINIATURE PAINT-SPRAY GUN FOR RECESSED AREAS

VANASSE, M. A. /N. AM. ROCKWELL CORP./ DATE- OCT. 1968  
MSC-13060

Miniature spray gun regulates paints and other liquids to spray at close range, facilitating spraying of remote or recessed areas. Individual valves for regulating air pressure and paint maximizes atomization for low pressure spraying.

**B68-10393**  
DETERMINING GAS LEAKAGE FROM BUBBLE FORMATIONS

DECASTRA, J. E. WELLS, F. E. DATE- OCT. 1968  
M-FS-14841

Gas leakage rates are quantitatively estimated using threaded and flanged fittings by standardizing bubble appearance. Three classes of bubble formations have been proposed.

**B68-10395**  
DESIGN OF FLUID-DUCT BENDS WITH LOW PRESSURE LOSS

GERLACH, R. /SOUTHWEST RES. INST./ DATE- OCT. 1968  
M-FS-20176

Duct bends are designed in which pressure losses and velocity profile distortions due to centrifugal force gradients are significantly reduced. The correction is achieved by properly changing the cross sectional area through the bend without affecting the shape of the duct at the upstream and downstream sides.

**B68-10398**  
BATTERY-PACKAGE DESIGN PROVIDES FOR CELL COOLING AND CONSTRAINT

GROSS, S. /BOEING CO./ DATE- OCT. 1968  
MSC-11839

Lightweight battery-package provides for even cooling of individual alkaline cells, constraint against cell expansion, and convenient placement of cells. The battery package also provides for venting of the cells and includes instrumentation to measure cell temperature, pressure, and voltage.

**B68-10401**  
COMPACT MONITORING AND CONTROL CONSOLE FOR PRESSURIZED GAS BOTTLES

FREEMAN, B. PILICHI, C. A. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968  
M-FS-14874

Compact monitoring and control console dispenses gas over a range of pressures from conventional compressed-gas cylinders. It incorporates in a single assembly the necessary equipment for a portable pressurization system that can be used in welding and other operations requiring a controlled gas supply.

**B68-10407**  
AN INVESTIGATION OF PARTICLE MIXING IN A GAS-FLUIDIZED BED

CARLSON, R. E. GABOR, J. D. DATE- DEC. 1968  
ARG-10182

Mechanism for particle movement in gas-fluidized beds was studied both from the theoretical and experimental points of view. In a \*\*two-dimensional\*\* fluidized bed particle trajectories were photographed when a bubble passed through.

**B68-10417**  
HAND-TIGHTENED, HIGH-PRESSURE SEAL

MEYER, W. A. /N. AM. ROCKWELL CORP./ DATE- DEC. 1968  
M-FS-18416

To provide flared tubing and hose connections for high-pressure hand tightened cryogenic service, a 1/4-inch male AN seal was modified by machining to receive a special, double-truncated-cone-shaped Kel-F washer between it and the flared flex hose connector.

**B68-10439**  
HYDROSTATIC TESTING OF POROUS ASSEMBLIES

BIGELOW, W. L. /N. AM. ROCKWELL CORP./ DATE- DEC. 1968  
M-FS-18298

Pores of the material were plugged with dust particles suspended in water. The plugging material used was a standard test dust prepared as a slurry in distilled water. This technique provides a permanent high-integrity seal for porous material without affecting its physical properties, yet permitting pressure testing to verify structural adequacy.

**B68-10440**  
LOW FRICTION SERVO VALVE

DUSTIN, M. O. DATE- NOV. 1968  
LEWIS-10574

Valve was developed using air bearings which

provide frictionless operation. The servo valve is of the flat plate type with rectangular meter openings. Fluid bearings support the metering plate. The overlap is adjustable by means of a variable hinge block support.

**B68-10441**  
**LOW COST TECHNIQUES FOR FABRICATING LOBED BEARINGS**

SCHULLER, F. T. DATE- NOV. 1968  
 LEWIS-10296

New low cost technique utilizes shims to create the lobes in bearing. Conventional methods of manufacture require accurate off-center grinding of the inside diameter of a bearing in a housing at various arc lengths depending on the number of lobes required.

**B68-10442**  
**AIR BEARING LIFT PAD /ABLP/**  
 BLAISE, H. T. DANE, D. H. DATE- DEC. 1968  
 M-FS-14685

ABLP is a hybrid between the precision air bearings and hover craft vehicles. The ABLP floats above the surface to clear cracks, roughness, and unevenness with the almost nonexistent friction of precision air pads.

**B68-10444**  
**COAXIAL CABLE STRIPPER FOR CONFINED AREAS**  
 BROWN, J. D. LIPSCOMB, W. G. /BOEING CO./ DATE- NOV. 1968  
 KSC-10167

Manual coaxial cable stripper quickly and accurately prepares a coaxial cable in a confined area. With this tool, preparation time is greatly reduced, and a completely inexperienced technician can perform the operation.

**B68-10503**  
**FLUID POWER-TRANSMITTING GAS BEARING**  
 COLLINS, D. DE FURIA, R. EZEKIEL, F. YANG, P. DATE- NOV. 1968  
 ERC-10097

Fluid power-transmitting gas bearing was designed that is essentially frictionless, stable, and highly efficient. The two basic components of this design are the base assembly and the upper plate. System could be a fluidic control system, a momentum exchange or reaction jet device.

**B68-10507**  
**ELECTRONIC COMPONENT RELIABILITY ANALYSIS BY DATA REDUCTION SYSTEM**  
 DIMM, R. M. HUNT, D. G. /BOEING CO./ DATE- NOV. 1968  
 NPO-10243

Mechanized data reduction system has been designed to take advantage of the data handling capacity of computers and to reduce voluminous and unrelated test and performance data to a format useful for the rapid analysis of electronic component reliability.

**B68-10509**  
**ROTARY-KNIFE STRIPPER FACILITATES REMOVAL OF X-RAY FILM FROM PACK**  
 MITCHELL, D. K. /BOEING CO./ DATE- NOV. 1968  
 M-FS-14837

Rotary-knife stripper facilitates removal of X-ray film from the daylight pack paper sleeve. The new stripper is rectangular, approximately 4 inches wide, 5 inches high, and 7 inches long.

**B68-10512**  
**BOYDBOLT, A POSITIVE-LATCH, SIMPLE-RELEASE FASTENER**  
 BRUEGER, J. FENSKE, T. HAMILL, W. KATZ, M. /BENDIX CORP./ DATE- NOV. 1968  
 MSC-13061

Fastener /Boydolt/ has recently been designed to furnish positive lock and release characteristics that positively prevent accidental adverse functions of lock or release.

**B68-10515**  
**FATIGUE OF REINFORCED CONCRETE BEAMS UNDER DYNAMIC LOADING**  
 CHAN, G. C. /WYLIE LABS./ DATE- NOV. 1968

**M-FS-14980**

Study, consisting of a literature survey and experiments, determined the strength properties of reinforced concrete beams subjected to vibrational stresses.

**B68-10530**  
**VERTICAL BORING MILL CAPACITY IS INCREASED**  
 YOUNG, R. J. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968

**M-FS-16196**  
 Commercially available vertical boring mill with a nominal capacity to 27 feet in diameter of workpiece has been modified in-shop to handle work up to 36 feet in diameter. Capacity was increased by adding extension saddles to the mill support columns on each side.

**B68-10531**  
**DESIGN ELIMINATES RADIAL THERMAL EXPANSION IN TURBINE STATOR COMPONENTS**  
 ANDERSON, M. J. DIETRICH, J. A. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968  
 M-FS-18146

Stress levels created in turbine stator components because of differential thermal expansion was eliminated by incorporation of a semifloating design, in which the stator vanes are retained by the outer ring assembly and radially piloted in the inner ring.

**B68-10534**  
**IMPROVED THERMAL TREATMENT OF ALUMINUM ALLOY 7075**  
 COCKS, F. H. /TYCO LABS./ DATE- DEC. 1968  
 M-FS-20083

Newly developed tempering treatment considerably increases the corrosion resistance of 7075-T6 alloy and concomitantly preserves its yield strength. The results of tests on samples of the alloy subjected to the above treatments show that when the overaging period is 12 hours /at 325 degrees F/, the alloy exhibits a yield strength of 73,000 psi.

**B68-10535**  
**PYROTECHNIC-ACTUATED CABLE RELEASE**  
 HANSON, R. W. DATE- DEC. 1968  
 XNP-10849

Remote, unattended means has been designed and reduced to practice that retains and then releases an attached load by means of a restrained cable. The cable is released by an electrical impulse on signal.

**B68-10537**  
**FLUIDIC TRANSDUCER GIVES PRESSURE OUTPUT AS FUNCTION OF TEMPERATURE**  
 WALL, D. B. /MARTIN CO./ DATE- DEC. 1968  
 SEE ALSO B68-10538  
 ERC-10093

Fluidic transducer gives a pressure output signal that is a direct function of the differential temperature sensed by the device. The transducer is arranged as a bridge.

**B68-10538**  
**FLUIDIC ANALOG AMPLIFIER**  
 MC KENZIE, C. P. /MARTIN CO./ DATE- DEC. 1968  
 SEE ALSO B68-10537  
 ERC-10102

Five-stage, high-gain, push-pull fluidic amplifier provides increased range and improved linearity. The fluidic amplifier was designed to operate in conjunction with a fluidic transducer.

**B68-10540**  
**TUBE JOINT LEAK REPAIR COUPLING**  
 FERGUSON, W. B. /N. AM. ROCKWELL CORP./ DATE- DEC. 1968  
 MSC-15022

Tube joint leak repair coupling consists of 2 split seals, 1 male split nut, 1 female split nut, and two aligning pins. Each split nut consists of 2 half-shell sections which, when engaged, are held together by a dovetail joint and an aligning pin.

B68-10549

## HIGH-TORQUE PRECISION STEPPING DRIVE

KASPARECK, W. E. DATE- NOV. 1968

M-FS-14772

Stepping drive has been designed for precise incremental angular positioning of scale models of spacecraft about a horizontal axis in order to accurately measure antenna receiving and transmitting characteristics. Positioning is insured by spring-loaded, self-locking plungers.

B68-10550

## CONTACT-SPRING FORMING MACHINE FOR FLAT

## CONDUCTOR CABLE RECEPTACLES

ANGELE, W. MARTINECK, H. G. DATE- DEC. 1968

SEE ALSO NASA-SP-5043

M-FS-20126

Machine tool produces beryllium-copper contact springs for FCC /flat conductor cable/ feed-through receptacles. The springs are heat-treated and plated to impart the required electrical contact properties.

B68-10551

## WELD PREPARATION TOOL FOR PIPES AND TUBING

WALLACE, E. D. DATE- DEC. 1968

KSC-09955

Improved scarfing tool consists of a mount-table, roller-guided assembly. It converts a conventional routing machine for relatively precise field preparation of pipes for welding.

B68-10567

## RADIAL INFLOW TURBINE DESIGN CHARTS

ROHLIK, H. E. DATE- DEC. 1968

LEWIS-10720

Design charts were prepared for the selection of turbine geometry corresponding to maximum turbine efficiency. Optimum values can be determined as functions of specific speed.

B68-10573

## FIXTURE FACILITATES SOLDERING OPERATIONS

WHITE, C. M. /CHRYSLER CORP./ DATE- DEC. 1968

M-FS-14456

Soldering fixture, designed for printed circuit cards, is a basic bench-mounted, self-contained integral unit combining all soldering needs into a compact, readily available work station. All tools, materials, and accessories are available to provide an ideal station to perform critical soldering.

B68-10575

## HOISTING FRAME FACILITATES HANDLING OF LARGE

## OBJECTS

COLPEAN, K. V. HOLCOMB, D. F. /N. AM. ROCKWELL

CORP./ DATE- DEC. 1968

M-FS-16166

Hoisting frame can be used with a standard 5-ton forklift to handle the large spreader bars, or other bulky pieces of equipment, much faster and more efficiently than with a boom or gantry crane. In addition forklifts of this type are more readily available.

## 06 COMPUTER PROGRAMS

B68-10005

## MOP /MATRIX OPERATION PROGRAMS SYSTEM/

MULLER, P. M. DATE- JAN. 1968

NPO-10429

MOP /Matrix Operation Programs/ system consists of a set of FORTRAN 4 subroutines which are related through a small common allocation. The system accomplishes all matrix algebra operations plus related input-output and housekeeping details.

B68-10006

## COMPUTER PROGRAM PERFORMS FREQUENCY

## ANALYSIS OF NONUNIFORM TURBINE DISK

## SUBJECTED TO TEMPERATURE GRADIENTS

SDO, P. P. /AEROJET-GEN. CORP./ DATE- JAN. 1968

NUC-10301

Computer program determines the natural

frequencies of a turbine disk of variable thickness subjected to uniform rotation and radial temperature gradients by using \*\*Rayleigh-Ritz\*\* procedure. The program involves the potential and kinetic energy expressions for a circular flat plate of variable thickness.

B68-10009

## COMPUTER PROGRAM CALCULATES AND PLOTS

## SURFACE AREA AND PORE SIZE DISTRIBUTION DATA

HALPERT, G. DATE- MAY 1968

GSFC-10362

Computer program calculates surface area and pore size distribution of powders, metals, ceramics, and catalysts, and prints and plots the desired data directly. Surface area calculations are based on the gas adsorption technique of Brunauer, Emmett, and Teller, and pore size distribution calculations are based on the gas adsorption technique of Pierce.

B68-10025

## COMPUTER PROGRAM FOR CALCULATION OF IDEAL

## GAS THERMODYNAMIC DATA

GORDON, S. MC BRIDE, B. J. DATE- MAY 1968

SEE ALSO NASA-TN-D-4097 AND NASA-TN-D-1454

LEWIS-10254

Computer program calculates ideal gas thermodynamic properties for any species for which molecular constant data is available. Partial functions and derivatives from formulas based on statistical mechanics are provided by the program which is written in FORTRAN 4 and MAP.

B68-10033

## COMPUTER PROGRAM FOR INTERPLANETARY CONIC

## PATCHING

DAVIS, D. A. GUSSOW, D. G. /BOEING CO./ DATE-

FEB. 1968

M-FS-14296

Computer program enables study of one-way transfers, single and double planet flybys, single and double planet stopovers, or mixed flyby and stopover trajectories. In each operation it first computes the heliocentric conic which connects the centers of the launch and target planets and requires a given trip time.

B68-10044

## GENERAL COMPUTER PROGRAM FOR CALCULATION

## OF RADIATION FROM INHOMOGENEOUS, NONISOBARIC,

## NONISOTHERMAL ROCKET EXHAUST PLUME

DASH, M. J. HUFFAKER, R. M. DATE- FEB. 1968

M-FS-14314

Computer program evaluates radiation from an axisymmetric gas body with water vapor, carbon dioxide, carbon monoxide, and solid carbon particles as radiating constituents, and hydrogen as a nonradiating constituent. The program provides a convenient method of evaluating a great many problems of radiation from rocket exhaust plumes.

B68-10045

## CONCEPT FOR SIMPLIFIED SERIAL DIGITAL

## DECODER

GREEN, R. R. DATE- FEB. 1968

NPO-10150

Modular decoder, which lends itself best to special purpose digital equipment using sequential access memories, decodes the first order Reed-Muller codes. It functions as a maximum-likelihood exhaustive-search decoder and is a modular implementation to accommodate codes of any length.

B68-10050

## SITE SURVEY FOR OPTIMUM LOCATION OF OPTICAL

## COMMUNICATION EXPERIMENTAL FACILITY

INNOVATOR NOT GIVEN /SYLVANIA ELECTRON.

SYSTEMS-EAST/ DATE- MAR. 1968

M-FS-13155

Site survey was made to determine the optimum location for an Optical Communication Experimental Facility /OCEF/ and to recommend several sites, graded according to preference. A site was desired which could perform two-way laser communication with a spacecraft and laser tracking

## 06 COMPUTER PROGRAMS

with a minimum of interruption by weather effects.

B68-10055

THREAD CUTTING WITH 3-AXIS N/C MILLING MACHINE

SALLEY, G. C. WOOD, C. H., JR. DATE- MAR. 1968  
LANGLEY-10017

TAPDIE, a generalized macro written for the APT numerical control system, cuts threads in stock too big for conventional machines or for which conventional methods are unsuitable. TAPDIE computes the machine tool path necessary and the information is passed on to a post-processor which produces a control tape.

B68-10096

COMPUTER PROGRAM PERFORMS STIFFNESS MATRIX STRUCTURAL ANALYSIS

BAMFORD, R. BATCHELDER, R. SCHEMLE, L. WADA, B. K. DATE- APR. 1968

NPO-10502

Computer program generates the stiffness matrix for a particular type of structure from geometrical data, and performs static and normal mode analyses. It requires the structure to be modeled as a stable framework of uniform, weightless members, and joints at which loads are applied and weights are lumped.

B68-10097

COMPUTER PROGRAM CALCULATES VELOCITIES AND STREAMLINES IN TURBOMACHINES

KATSANIS, T. DATE- MAY 1968  
LEWIS-10252

Computer program calculates the velocity distribution and streamlines over widely separated blades of turbomachines. It gives the solutions of a two dimensional, subsonic, compressible nonviscous flow problem for a rotating or stationary circular cascade of blades on a blade-to-blade surface of revolution.

B68-10127

AUTOMATIC PLANNING CONCEPT - AN ANALYSIS OF OPTIMUM SCHEDULING

REBELEIN, P. R. TRUENBELS, P. /HONEYWELL, INC./ DATE- APR. 1968  
M-FS-14198

Study considers resource costs, mission constraints, and experiment results as linear functions, insofar as possible, in an effort to develop optimum scheduling by the use of linear programming. It involves a mathematical approach in which a number of constraints are considered operative.

B68-10137

COMPUTER PROGRAM CONDUCTS FACILITIES UTILIZATION AND OCCUPANCY SURVEY

MINER, R. R. SPRAGUE, H. R. ZIMMERMAN, J. S. DATE- APR. 1968 SEE ALSO B67-10476  
NPO-10438

Computer program identifies the uses of all facilities and provides information on the net area in each room as well as the number and classification of people occupying them. The system also provides a means to indicate unsatisfactory work areas and may be able to be updated each month.

B68-10139

COMPUTER PROGRAM AIDS DUAL REFLECTOR ANTENNA SYSTEM DESIGN

FIRNETT, P. GERRITSEN, R. JARVIE, P. /INFORMATICS, INC./ LUDWIG, A. DATE- APR. 1968  
NPO-10501

Computer program aids in the design of maximum efficiency dual reflector antenna systems. It designs a shaped Cassegrainian antenna which has nearly 100 percent efficiency, and accepts input parameters specifying an existing conventional antenna and produces as output the modifications necessary to conform to a shaped design.

B68-10150

COMPUTER PROGRAMS FOR THERMODYNAMIC AND TRANSPORT PROPERTIES OF HYDROGEN

HALL, W. J. MC CARTY, R. D. RODER, H. M. /NATL. BUR. OF STD./ DATE- MAY 1968

NUC-10537

Computer program subroutines provide the thermodynamic and transport properties of hydrogen in tabular form. The programs provide 18 combinations of input and output variables. This program is written in FORTRAN 4 for use on the IBM 7044 or CDC 3600 computers.

B68-10158

COMPUTER PROGRAM DETERMINES EXACT TWO-SIDED TOLERANCE LIMITS FOR NORMAL DISTRIBUTIONS

FRIEDMAN, H. A. WEBB, S. R. /N. AM. ROCKWELL CORP./ DATE- MAY 1968  
M-FS-18045

Computer program determines by numerical integration the exact statistical two-sided tolerance limits, when the proportion between the limits is at least a specified number. The program is limited to situations in which the underlying probability distribution for the population sampled is the normal distribution with unknown mean and variance.

B68-10159

COMPUTER PROGRAM DETERMINES VIBRATION IN THREE-DIMENSIONAL SPACE OF HYDRAULIC LINES EXCITED BY FORCED DISPLACEMENTS

DODGE, W. G. /N. AM. AVIATION/ DATE- MAY 1968  
M-FS-12226

Computer program determines the forced vibration in three dimensional space of a multiple degree of freedom beam type structural system. Provision is made for the longitudinal axis of the analytical model to change orientation at any point along its length. This program is used by industries in which structural design dynamic analyses are performed.

B68-10164

DIGITAL FILTER SYNTHESIS COMPUTER PROGRAM

MOYER, R. A. MUNOZ, R. M. DATE- MAY 1968  
ARC-10130

Digital filter synthesis computer program expresses any continuous function of a complex variable in approximate form as a computational algorithm or difference equation. Once the difference equation has been developed, digital filtering can be performed by the program on any input data list.

B68-10187

ELAS - A GENERAL PURPOSE COMPUTER PROGRAM FOR THE EQUILIBRIUM PROBLEMS OF LINEAR STRUCTURES

AKYUZ, F. A. UTKU, S. DATE- JUN. 1968  
NPO-10598

Digital computer program ELAS handles the equilibrium problems of linear structures of one, two, or three dimensional continuum. ELAS generates the governing equations for the unknown deflections of the mesh points that define the stationary point of the total potential energy function associated with the given loading and unknown deflections.

B68-10193

DIGITAL FILTER SUPPRESSES EFFECTS OF NONSTATISTICAL NOISE BURSTS ON MULTICHANNEL SCALAR DIGITAL AVERAGING SYSTEMS

GOODMAN, L. S. SALTER, F. O. DATE- JUN. 1968  
ARG-90143

Digital filter suppresses the effects of nonstatistical noise bursts on data averaged over multichannel scalar. Interposed between the sampled channels and the digital averaging system, it uses binary logic circuitry to compare the number of counts per channel with the average number of counts per channel.

B68-10208

JPWKIC - GENERAL KEY WORD IN CONTEXT AND SUBJECT INDEX REPORT GENERATOR

JIRKA, R. KABASHIMA, N. KELLY, D. PLESSET, M. DATE- JUN. 1968  
NPO-10589

JPWKIC computer program is a general key word in context and subject index report generator specifically developed to help nonprogrammers and nontechnical personnel to use the computer to

access files, libraries and mass documentation. This program is designed to produce a KWIC index, a subject index, an edit report, a summary report, and an exclusion list.

**B68-10216**  
COMPUTER PROGRAM DETERMINES SYSTEM STABILITY /DIGSTA/  
LORENZO, C. F. SCALZOTT, L. L. DATE- JUN. 1968  
LEWIS-10395

Computer program implements a stability criterion that can be applied directly to the numerical solutions of systems of differential equations. The program accepts as input the time function of the system, a time to view the transient, and an acceptable amplitude boundary for any steady-state oscillation.

**B68-10217**  
COMPUTER PROGRAM OFFERS NEW METHOD FOR CONSTRUCTING PERIODIC ORBITS IN NONLINEAR DYNAMICAL SYSTEMS  
BENNETT, A. G. HANAFY, L. M. PALMORE, J. I. DATE- JUN. 1968  
M-FS-14654

Computer program uses an iterative method to construct precisely periodic orbits which dynamically approximate solutions that converge to precise dynamical solutions in the limit of the sequence. The method used is a modification of the generalized Newton-Raphson algorithm used in analyzing two point boundary problems.

**B68-10226**  
COMPUTER PROGRAM ANALYZES BUCKLING OF SHELLS OF REVOLUTION WITH VARIOUS WALL CONSTRUCTIONS, BOSOR  
ALMROTH, B. G. BUSHNELL, D. SOBEL, L. H. /LOCKHEED MISSILES AND SPACE CO./ DATE- JUN. 1968  
LANGLEY-10290

Computer program performs stability analyses for a wide class of shells without unduly restrictive approximations. The program uses numerical integration, finite difference of finite element techniques to solve with reasonable accuracy almost any buckling problem for shells exhibiting orthotropic behavior.

**B68-10227**  
SEAL /SUBNETWORK ENUMERATION AND LISTING/  
HAPP, W. W. MC INTOSH, F. J. DATE- JUN. 1968  
ERC-10116

SEAL /Subnetwork Enumeration And Listing/ computer program uses combinatorial techniques to generate all of the nonredundant subnetwork configurations derivable from an asymmetrical network or device. This is accomplished by a systematic shorting and opening of accessible terminals to obtain the desired allowable configurations.

**B68-10232**  
HICOV /NEWTON-RAPHSON CALCULUS OF VARIATION WITH AUTOMATIC TRANSVERSALITIES/  
HEINTSCHEL, T. J. /GE/ DATE- JUL. 1968  
M-FS-14468

Computer program generates trajectories that are optimum with respect to payload placed in an earth orbit. It uses a subroutine package which produces the terminal and transversality conditions and their partial derivatives. This program is written in FORTRAN 4 and FORMAC for the IBM 7094 computer.

**B68-10287**  
DEVELOPMENT OF ELECTRONIC DATA PROCESSING /EDP/-AUGMENTED MANAGEMENT SYSTEM  
SCOTT, J. E. WADDLETON, T. R. /BOEING CO./ DATE- AUG. 1968  
M-FS-14715

To tailor the existing Unified Flight Analysis System to management data rather than technical data, a pilot model could be produced in \*\*breadboard\*\* form, using electronic data processing, in a matter of a few months at very moderate cost. Such a system lends itself to continuous refinement.

**B68-10292**  
LINEAR SYSTEMS OF EQUATIONS SOLVED USING MATHEMATICAL ALGORITHMS  
BAREISS, E. H. DATE- AUG. 1968 SEE ALSO ANL-7213  
ARG-10146

New mathematical algorithm solves linear systems of equations,  $AX$  equals  $B$ , and preserves the integer properties of the coefficients. The algorithms presented can also be used for the efficient evaluation of determinates and their leading minors.

**B68-10296**  
COMPUTER GRAPHICS DATA CONDITIONING  
HAGENAU, K. H. MC MILLEN, G. C. /BOEING CO./ DATE- AUG. 1968  
M-FS-14695

Graphics data conditioning program expedites engineering analysis of flight data and ensures timely correction of measurement errors. By adding interactive computer graphic displays to existing data conditioning programs, computational results are immediately visible, enabling on-line intervention and control of computer processing.

**B68-10335**  
COMPUTER PROGRAM ANALYZES AND DESIGNS SUPERSONIC WING-BODY COMBINATIONS  
WOODWARD, F. A. /BOEING CO./ DATE- SEP. 1968  
ARC-10141

Computer program formulates geometric description of the wing body configuration, optimizes wing camber shape, determines wing shape for a given pressure distribution, and calculates pressures, forces, and moments on a given configuration. The program consists of geometry definition, transformation, and paneling, and aerodynamics, and flow visualization.

**B68-10354**  
FORTRAN OPTICAL LENS DESIGN PROGRAM  
FIRNETT, P. J. SCHMIDT, L. F. WILSON, L. A. /INFORMATICS, INC./ DATE- SEP. 1968  
NPO-10603

Computer program uses the principles of geometrical optics to design optical systems containing up to 100 planes, conic or polynomial aspheric surfaces, 7 object points, 6 colors, and 200 rays. This program can be used for the automatic design of optical systems or for the evaluation of existing optical systems.

**B68-10356**  
ANALYSIS OF ANNULAR COMBUSTORS  
INNOVATOR NOT GIVEN /NORTHERN RES. ENG. CORP./ DATE- SEP. 1968 SEE ALSO NASA-CR-72374 AND NASA-CR-72375  
LEWIS-10399

Computer program is used for analysis and design of gas turbine combustors. The program analyzes fluid flow, combustion, and heat transfer in annular and rectangular combustors with diffusers, making use of currently available analytical methods and correlations.

**B68-10361**  
REAL FLUID PROPERTIES OF NORMAL AND PARAHYDROGEN  
GOLDBERG, F. N. HAFERD, A. M. DATE- SEP. 1968  
LEWIS-10458

Computer program calculates the real fluid properties of normal or parahydrogen using a library of single function calls without initial estimates. Accurate transport and thermodynamic properties of molecular hydrogen are needed for advanced propulsion systems.

**B68-10374**  
AXISYMMETRIC TWO-PHASE PERFECT GAS PERFORMANCE PROGRAM  
KLIEGEL, J. R. NICKERSON, G. R. /TRW SYSTEMS/ DATE- OCT. 1968 SEE ALSO B68-10375, B68-10376, AND B68-10377  
MSC-11774

Computer program calculates the inviscid axisymmetric nozzle expansion of propellant systems having both gaseous and condensed exhaust products. The program uses velocity and thermal

## 06 COMPUTER PROGRAMS

lags and will perform calculations for contoured and conical nozzles.

B68-10375

ONE-DIMENSIONAL REACTING GAS NONEQUILIBRIUM PERFORMANCE PROGRAM

FREY, H. M. KLIEGEL, J. R. /TRW SYSTEMS/ DATE- OCT. 1968 SEE ALSO B68-10374, B68-10376, AND B68-10377  
MSC-11777

Computer program calculates the inviscid one-dimensional equilibrium, frozen, and nonequilibrium nozzle expansion of gaseous propellant exhaust mixtures containing the elements - carbon, hydrogen, oxygen, nitrogen, fluorine and chlorine. The program performs calculations for conical nozzles only.

B68-10376

ONE-DIMENSIONAL TWO-PHASE REACTING GAS NONEQUILIBRIUM PERFORMANCE PROGRAM

CHERRY, S. S. FREY, H. M. KLIEGEL, J. R. QUAN, V. /TRW SYSTEMS/ DATE- OCT. 1968 SEE ALSO B68-10374, B68-10375, AND B68-10377  
MSC-11780

Computer program calculates the inviscid one-dimensional equilibrium, frozen, and nonequilibrium nozzle expansion of propellant exhaust mixtures containing carbon, hydrogen, oxygen, nitrogen, fluorine, chlorine and either aluminum, beryllium, boron or lithium. This program performs calculations for conical nozzles only.

B68-10377

AXISYMMETRIC REACTING GAS NONEQUILIBRIUM PERFORMANCE PROGRAM

KLIEGEL, J. R. MELDE, J. E. NICKERSON, G. R. QUAN, V. /TRW SYSTEMS/ DATE- OCT. 1968 SEE ALSO B68-10374, B68-10375, AND B68-10376  
MSC-11781

Computer program calculates the inviscid one-dimensional equilibrium, frozen, and nonequilibrium nozzle expansion of propellant exhaust mixtures containing these six elements - carbon, hydrogen, oxygen, nitrogen, fluorine, and chlorine plus either aluminum, beryllium, boron or lithium. This program will perform calculations for contoured and conical nozzles.

B68-10403

INTERNAL VELOCITY FACTORS

CATHCART, J. R. FRANK, A. J. MASSAGLIA, J. L. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968  
MSC-15002

Computer program analyzes the entries and planetary trajectories of space vehicles. It obtains the equivalence of altitude and flight path angle, respectively, to acceleration load factor with respect to velocity for a given inertial velocity.

B68-10405

ANALYSIS OF FILAMENT REINFORCED METAL-SHELL PRESSURE VESSELS

LANDES, R. E. MORRIS, E. E. /AEROJET GEN. CORP./ DATE- NOV. 1968  
LEWIS-10352

Computer program analyzes design requirements and computes designs for metal-lined filament-wound pressure vessels with either geodesic /helical/ or in-plane filament winding patterns on the cylindrical portion and over the ends, reinforced by circumferential windings on the cylindrical portion.

B68-10410

DSN SEVEN DAY/TWELVE WEEK SCHEDULE PROGRAM

HOLZMAN, R. E. DATE- DEC. 1968  
NPO-10752

Deep Space Network scheduling program allocates resources based on the user's requirements. The system reviews and allocates the requests for equipment and resources. Depending upon the program input either the seven day or the twelve week schedule is generated.

B68-10416

CIRCUS--A DIGITAL COMPUTER PROGRAM FOR

TRANSIENT ANALYSIS OF ELECTRONIC CIRCUITS

MOORE, W. T. STEINERT, L. L. /BOEING CO./ DATE- DEC. 1968  
M-FS-15002

Computer program simulates the time domain response of an electronic circuit to an arbitrary forcing function. CIRCUS uses a charge-control parameter model to represent each semiconductor device. Given the primary photocurrent, the transient behavior of a circuit in a radiation environment is determined.

B68-10421

COMPUTER PROGRAM FOR MACHINE DESIGN OF CASSEGRAIN FEED SYSTEMS

POTTER, P. D. DATE- NOV. 1968  
NPO-10588

Program designs the feed system geometry and the subreflector surface, with the main reflector configuration and frequency of operation as input data. Although the feedhorn is not designed, its required gain, beamwidth, and approximate radiation pattern are specified.

B68-10422

GENERALIZED NEWTON-RAPHSON TRAJECTORY OPTIMIZATION-GENERATOR 1

COPE, D. D. ESKRIDGE, C. D. HANAFY, L. M. /BOEING CO./ DATE- NOV. 1968  
M-FS-15020

Computer program constructs a sequence of optimal solutions to dynamically-approximate linear equations. Specification of the number and type of subarcs in the optimal solution allows simultaneous satisfaction of all switching criteria.

B68-10423

SYMBOLIC REDUCTION OF BLOCK DIAGRAMS USING FORMAC

LORENZO, C. F. SWIGERT, P. DATE- NOV. 1968  
LEWIS-10409

Two computer programs - one written in FORMAC to generate the desired symbolic expressions, the other in FORTRAN 4 to numerically evaluate the expressions are announced. The FORTRAN program accepts the symbolic punched output from the FORMAC program in either unexpanded or expanded form. It numerically evaluates the expressions.

B68-10435

GERT EXCLUSIVE-OR COMBINING PATHS AND LOOPS OF ELECTRICAL NETWORKS

ALAN, A. PRITSKER, B. /ARIZONA STATE UNIV./ DATE- OCT. 1968  
ERC-10206

Program takes a network with multi-parameter branches and reduces it to a network having a single branch connecting source nodes to sink nodes. The program calculates probability, expected time, and variance in the time to go from each source node to each sink node of the GERT network.

B68-10445

ENVIRONMENTAL TEST PLANNING, SELECTION AND STANDARDIZATION AIDS AVAILABLE

COPELAND, E. H. FOLEY, J. T. DATE- DEC. 1968  
SAN-10028

Requirements for instrumentation, equipment, and methods to be used in conducting environmental tests on components intended for use by a wide variety of technical personnel of different educational backgrounds, experience, and interests is announced.

B68-10446

MODIFIED MUTHOPP MEAN CAMBER COMPUTER PROGRAM

LAMAR, J. E. DATE- DEC. 1968  
LANGLEY-10376

Computer program which determines the mean camber surface required to support a given set of loadings on a composite wing in subsonic compressible flow has been developed.

B68-10447

PLUME RADIATION PROGRAM

DE SOTO, S. VOK, C. A. /N. AM. ROCKWELL CORP./



DATE- OCT. 1968

M-FS-13202

Computer program determines the radiant flux to the base region of a real gas system with an axisymmetric geometry and any axisymmetric property distribution.

B68-10448

PERFORMANCE ANALYSIS OF ELECTRICAL CIRCUITS

/PANE/

JOHNSON, K. L. STEINBERG, L. L. /BOEING CO./

DATE- OCT. 1968

M-FS-15001

Automated statistical and worst case computer program has been designed to perform d.c. and a.c. steady circuit analyses. The program determines the worst case circuit performance by solving circuit equations.

B68-10449

SINGLE DEGREE OF FREEDOM ANTENNA POINTING

PROGRAM /ANTENA/

FLEISHHER, G. E. DATE- NOV. 1968

NPD-10756

Computer program optimizes the accuracy of pointing a radio-frequency antenna at a target whose position is time varying but known with respect to a certain reference frame.

B68-10450

COMPUTER PROGRAM TRACK PERFORMS TRANSIENT

AND/OR STEADY STATE THERMAL ANALYSIS WITH

COUPLED FLUID FLOW AND HEAT CONDUCTION

LEE, A. Y. WOODS, M. D. WOODS, H. D.

/WESTINGHOUSE ASTRONUC. LAB./ DATE- NOV. 1968

NUC-10189

Computer program called TRACK was developed by combining a transient fluid flow computer code and the existing modified TDSS heat conduction code to perform the computation.

B68-10451

A REQUEST-ORIENTED INFORMATION SELECTION

PROGRAM

RYAN, E. DATE- OCT. 1968

LEWIS-10255

General purpose information retrieval program written entirely in FORTRAN 4 was developed and can be used with any file of fixed format documents. This program is easily used by noncomputer personnel and provides flexibility in search requests and output format.

B68-10452

MODIFIED MULTHOFF LIFTING SURFACE LOADING

PROGRAM

LAMAR, J. E. DATE- NOV. 1968

LANGLEY-10375

Computer program determines the longitudinal subsonic aerodynamic characteristics of composite wings. The program uses the basic theoretical method of Multhoff in predicting the loading data.

B68-10453

COMPUTER PROGRAM FOR PARAMETER

OPTIMIZATION

GLATT, C. R. HAGUE, D. S. /BOEING CO./ DATE-

DEC. 1968

ARC-10168

Flexible, large scale digital computer program was designed for the solution of a wide range of multivariable parameter optimization problems. The program has the ability to solve constrained optimization problems involving up to one hundred parameters.

B68-10457

GERT-SIMULATION PROGRAM FOR GERT NETWORK

ANALYSIS

ALAN, A. PRITSKER, B. /ARIZONA STATE UNIV./

DATE- OCT. 1968

ERC-10209

GERT Simulation Program simulates GERT networks to obtain statistics on specified nodes of the network. It performs sampling experiments to determine which branches of the network are taken and how long it takes to traverse a branch of the network.

B68-10576

DIGITAL COMPUTER TECHNIQUE FOR SETUP AND

CHECKOUT OF AN ANALOG COMPUTER

AMBARUCH, R. /IBM/ DATE- NOV. 1968

M-FS-13969

Computer program technique, called Analog Computer Check-Out Routine Digitally /ACCORD/, generates complete setup and checkout data for an analog computer. In addition, the correctness of the analog program implementation is validated.

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Cumulative Index to Tech Briefs

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ARC-10174 B68-10365 01

Automatic system nondestructively monitors and records fatigue crack growth  
LANGLEY-10091 B68-10379 01

Automatic calibration apparatus for telemetry systems  
NPD-10560 B68-10514 01

Telescope dome control system automatically tracks sun  
MSC-10966 B68-10521 02

Welding skate with computerized controls  
M-FS-20224 B68-10566 01

## AUTOMATIC CONTROL VALVES

Low friction servo valve  
LEWIS-10574 B68-10440 05

## AUTOMATION

Microprobe investigation of brittle segregates in aluminum MIG and TIG welds  
M-FS-14720 B68-10334 03

## AUXILIARY POWER SOURCES

Zinc-oxygen primary cell yields high energy density  
M-FS-14661 B68-10218 01

## AVALANCHE DIODES

Current-limiting voltage regulator  
MSC-11824 B68-10305 01

Solid state high-voltage pulser operates with low supply voltage  
M-FS-14034 B68-10308 01

Transistorized Marx bank pulse circuit provides voltage multiplication with nanosecond rise-time  
ARG-10110 B68-10328 01

Low-cost, fast-response drive circuit for electromagnetic torque motors  
LEWIS-10143 B68-10386 01

Method for measuring alternator voltage transients  
LEWIS-10373 B68-10513 01

## AVERAGE

Digital filter suppresses effects of nonstatistical noise bursts on multichannel scaler digital averaging systems  
ARG-90143 B68-10193 06

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<b>AXIAL STRESS</b>				Astronaut space suit communication antenna		
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Improved electromechanical master-slave manipulator				MSC-11825	B68-10289	01
ARG-10027	B68-10372	05		<b>BARIUM TITANATES</b>		
<b>B</b>				High-voltage pulse generator developed for wide-gap spark chambers		
<b>BACTERIA</b>				ARG-10136	B68-10283	01
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SAN-10003	B68-10231	04		LANGLEY-10294	B68-10542	01
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LANGLEY-90194	B68-10064	05		M-FS-14856	B68-10351	03
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Improved relay optical element for spectroradiometer using cryogenically cooled detector				M-FS-14710	B68-10300	05
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The X square statistic and goodness of fit test GSFC-10547	B68-10136	02	Effects of high frequency current in welding aluminum alloy 6061 M-FS-18337	B68-10383	05
<b>CORROSION</b>			Fiberglass prevents cracking of polyurethane foam insulation on cryogenic vessels M-FS-20058	B68-10406	02
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Effects of high frequency current in welding aluminum alloy 6061 M-FS-18337	B68-10383	05	Nickel base alloy with improved stress rupture properties LEWIS-10283	B68-10344	03
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<b>CRYOGENIC MAGNETS</b> Rectangular configuration improves superconducting cable ARG-90088	B68-10098	02	<b>CURIUM 242</b> Detection sensitivities in 3-8 MeV neutron activation ARG-10210	B68-10298	02
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<b>CRYSTAL GROWTH</b> Grain-boundary migration in KCl bicrystals ARG-10181	B68-10455	03			
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production of iodine-123  
LEWIS-10518 B68-10433 03

## CYLINDRICAL BODIES

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centering for grinding or turning of  
cylinders  
SAN-10021 B68-10318 05

Modified sine bar device measures small  
angles with high accuracy  
GSFC-438 B68-10322 02

Electron beam selectively seals porous metal  
filters  
LEWIS-10162 B68-10331 05

## CYTOLOGY

A microlagoon technique for the culture of  
mammalian cells  
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## D

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slosh  
LANGLEY-90194 B68-10064 05

Sleeved damper limits spring surging  
MSC-12071 B68-10111 05

Vibration testing and dynamic studies of  
relays  
M-FS-14542 B68-10268 01

Indium adhesion provides quantitative  
measure of surface cleanliness  
SAN-10024 B68-10342 01

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in prismatic bars  
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liquid hydrogen density measurement  
M-FS-14115 B68-10166 01

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M-FS-18062 B68-10282 02

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decoder  
NPO-10150 B68-10045 06

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## DATA CORRELATION

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## DATA PROCESSING

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techniques  
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liquid hydrogen density measurement  
M-FS-14115 B68-10166 01

Development of Electronic Data Processing  
/EDP/ augmented management system  
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Fully automatic telemetry data processor  
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recharging of battery cells  
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of complex systems  
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by data reduction system  
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subject index report generator  
NPO-10589 B68-10208 06

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program  
LEWIS-10255 B68-10451 06

Long-term data storage and retrieval  
system, a concept  
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## DATA SMOOTHING

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M-FS-14695 B68-10296 06

## DATA STORAGE

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MSC-11594 B68-10155 01

Improvement in recording and reading  
holograms  
ERC-10151 B68-10347 02

A request-oriented information selection  
program  
LEWIS-10255 B68-10451 06

Long-term data storage and retrieval  
system, a concept  
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M-FS-13599 B68-10093 01

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MSC-11825 B68-10289 01

Simultaneous message framing and error  
detection  
MSC-12001 B68-10330 01

Two-way digital driver/receiver uses one  
set of lines  
ERC-10055 B68-10437 01

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/EDP/ augmented management system  
M-FS-14715 B68-10287 06

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decoder  
NPO-10150 B68-10045 06

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decoder  
NPO-10118 B68-10058 01

Simultaneous message framing and error  
detection  
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water-soluble xenon compounds are studied

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Decomposition vessel GSFC-10343	B68-10104	03	M-FS-14323		
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Deep space FM system, a concept MSC-11825	B68-10289	01	<b>DENSITY (MASS/VOLUME)</b>		
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<b>DEEP SPACE NETWORK</b>			<b>DENSITY MEASUREMENT</b>		
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<b>DEFLECTION</b>			Study of radiation effects on mammalian cells in vitro ARG-10191	B68-10294	02
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DIELECTRIC PROPERTIES Glass coated single grid for charged particle acceleration LEWIS-10106	B68-10215	03	DIFFERENTIATORS Gimbal angle sensor GSFC-10305	B68-10315	01
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# DIFFUSION WELDING

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<b>DISPENSERS</b> Dispensing graduate for butadiene NPO-10070	B68-10524	03	<b>DROPOUTS</b> Phase-lock loop frequency control and the dropout problem M-FS-13948	B68-10130	01
<b>DISPLAY DEVICES</b> Hydra 1 data display system MSC-11594	B68-10155	01	<b>DROPS (LIQUIDS)</b> System for measuring spatial distribution of ejected droplets, a concept NPO-10185	B68-10402	01
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Random access-random release relay switching matrix M-FS-12590	B68-10301	01	Weld microfissuring in Inconel 718 minimized by minor elements M-FS-18185	B68-10251	03
Fluidic-thermochromic display device ERC-10031	B68-10350	01	High temperature alloy LEWIS-10377	B68-10253	03
Selective video blanking technique M-FS-20013	B68-10434	01	Fabrication techniques developed for small-diameter, thin-wall tungsten and tungsten alloy tubing ARG-10100	B68-10284	05
<b>DISTILLATION EQUIPMENT</b> Distillation device supplies cesium vapor at constant pressure XNP-08124	B68-10020	03	Pre-weld heat treatment improves welds in Rene 41 M-FS-18174	B68-10285	03
<b>DISTRIBUTING</b> Controllability of distributed-parameter systems M-FS-14929	B68-10346	02	Nickel base alloy with improved stress rupture properties LEWIS-10283	B68-10344	03
<b>DISTRIBUTION FUNCTIONS</b> Solution of differential equations by application of transformation groups M-FS-14802	B68-10276	02	Nickel-base superalloy's excellent properties promote its service to 2200 degrees F LEWIS-10355	B68-10380	03
<b>DOCUMENTATION</b> A request-oriented information selection program LEWIS-10255	B68-10451	06	<b>DUCTS</b> Design of fluid-duct bends with low pressure loss M-FS-20176	B68-10395	05
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<b>DOPPLER EFFECT</b> Communication system features dual mode range acquisition plus time delay measurement M-FS-14323	B68-10306	01	Compact rotating cup anemometer NPO-10563	B68-10436	01
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## DUST

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## EARTH ORBITS

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## EARTH SURFACE

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M-FS-20187 B68-10391 03

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M-FS-14929 B68-10346 02

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Superconductive thin film makes convenient liquid helium level sensor  
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## ELECTRIC POWER

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Conceptual hermetically sealed elbow actuator  
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System measures arc energy dissipated in relay contact cycling  
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NPO-10185 B68-10402 01

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MSC-11447 B68-10220 01

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M-FS-14713 B68-10303 01

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Nondestructive test determines overload destruction characteristics of current limiter fuses  
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Electromotive series established for metals used in aerospace technology  
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Superconductive thin film makes convenient liquid helium level sensor  
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SAN-10020 B68-10267 01

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Stress-corrosion-induced property changes in aluminum alloys  
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M-FS-14267 B68-10260 02

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## ELECTROCHEMISTRY

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System for measuring spatial distribution of ejected droplets, a concept  
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## ELECTROMAGNETIC FIELDS

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GSFC-10222 B68-10321 01

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/PANE/  
M-FS-15001 B68-10448 06

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NPD-10756 B68-10449 06

Computer program TRACK performs transient  
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coupled fluid flow and heat conduction  
NUC-10189 B68-10450 06

A request-oriented information selection  
program  
LEWIS-10255 B68-10451 06

Modified Multhopp lifting surface loading  
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Computer program for parameter  
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ARC-10168 B68-10453 06

GERT simulation program for GERT network  
analysis  
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Digital computer technique for setup and  
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in prismatic bars  
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LEWIS-10379 B68-10046 03

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in 2219-T81 aluminum alloy  
LEWIS-10479 B68-10561 03

## FRAMING CAMERAS

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M-FS-18062 B68-10282 02

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phase are studied  
ARG-10200 B68-10408 03

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structure  
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GSFC-10183 B68-10054 01

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analysis of nonuniform turbine disk  
subjected to temperature gradients  
NUC-10301 B68-10006 06

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Cryogenic liquid level measuring probe ARG-10138	B68-10291	01	Dynamic-reservoir lubricating device M-FS-14652	B68-10261	05
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Communication system features dual mode range acquisition plus time delay measurement M-FS-14323	B68-10306	01	One-dimensional two-phase reacting gas nonequilibrium performance program MSC-11780	B68-10376	06
<b>FREQUENCY CONVERTERS</b>			Axisymmetric reacting gas nonequilibrium performance program MSC-11781	B68-10377	06
Regulated dc-to-dc converter features low power drain GSFC-03429	B68-10017	01	<b>FUEL CELLS</b>		
Automatic patient respiration failure detection system with wireless transmission ARC-10174	B68-10365	01	Improved fuel-cell-type hydrogen sensor M-FS-14656	B68-10263	01
System converts optical phase changes to RF phase changes M-FS-20091	B68-10430	01	<b>FUEL COMBUSTION</b>		
<b>FREQUENCY DISTRIBUTION</b>			Fire retardant foams developed to suppress fuel fires ARC-10098	B68-10358	03
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<b>FREQUENCY DIVIDERS</b>			Two-fluid, impinging-sheet injector NPO-10547	B68-10338	05
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<b>FREQUENCY MODULATION</b>			Between-bearing shaft seal, a concept M-FS-18179	B68-10286	05
Deep space FM system, a concept MSC-11825	B68-10289	01	<b>FUEL SYSTEMS</b>		
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System converts optical phase changes to RF phase changes M-FS-20091	B68-10430	01	One-shot pulse shaper circuit XGS-11379	B68-10012	01
<b>FREQUENCY RANGES</b>			Synthesis of electro-optic modulators for amplitude modulation of light M-FS-14268	B68-10275	02
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<b>FREQUENCY SHIFT</b>			Computer program for calculation of ideal gas thermodynamic data LEWIS-10254	B68-10025	06
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Dynamic linearity measurement technique KSC-10186	B68-10290	01	Measuring thermal expansion of multiple specimens at high temperature NUC-10153	B68-10122	05
<b>FRICTION</b>			Silicon solar cell monitors high temperature furnace operation NUC-10163	B68-10148	01
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<b>FRICTION FACTOR</b>			Isotopically pure magnesium isotope-24 is prepared from magnesium-24 oxide ARG-10154	B68-10293	02
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GSFC-10686 B68-10255 02

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ARG-10120 B68-10182 01

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## GAS EXPANSION

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MSC-11774 B68-10374 06

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of gas flow  
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## GAS WELDING

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## GASEOUS DIFFUSION

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ARG-10109 B68-10077 02

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MSC-11600 B68-10241 01

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## GELATINS

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in vitro  
ARG-10191 B68-10294 02

## GENETIC CODE

Study of radiation effects on mammalian cells  
in vitro  
ARG-10191 B68-10294 02

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M-FS-14679 B68-10228 02

## GEODETIC COORDINATES

Theory of a refined earth model  
M-FS-14679 B68-10228 02

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controlled size distribution  
NPO-10007 B68-10297 05

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supersonic wing-body combinations  
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M-FS-14691 B68-10309 01

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ARG-10170 B68-10454 03

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## GERMANIUM DIODES

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counting rates  
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application to gettering systems  
ARG-10208 B68-10414 03

## GIMBALLESS INERTIAL NAVIGATION

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MSC-11584 B68-10304 02

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GSFC-10305 B68-10315 01

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to ceramics  
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of parallel gap soldering  
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high temperature areas  
MSC-10285 B68-10277 05

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and fluorometric measurements  
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MSC-12101 B68-10238 01

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<b>GLYCEROLS</b> Radiation effects on bacterial cells ARG-10064	B68-10169	04		
<b>GOLD</b> Improved fuel-cell-type hydrogen sensor M-FS-14656	B68-10263	01		
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<b>GRAPHITE</b> Reaction rates of graphite with ozone measured by etch decoration ARG-10086	B68-10101	03		
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<b>GRAVITATION</b> Theory of a refined earth model M-FS-14679	B68-10228	02		
<b>GRIDS</b> System for measuring spatial distribution of ejected droplets, a concept NPD-10185	B68-10402	01		
<b>GRINDING (MATERIAL REMOVAL)</b> Manual of industrial diamonds plus dressing and grinding criteria for machining superalloys M-FS-14582	B68-10239	05		
			<b>GRINDING MACHINES</b> Preparing rock powder specimens of controlled size distribution NPD-10007	B68-10297 05
			Compressible sleeve provides automatic centering for grinding or turning of cylinders SAN-10021	B68-10318 05
			<b>GROOVES</b> Quick-attach clamp XFR-05421	B68-10250 05
			Spiral-grooved shaft seals substantially reduce leakage and wear LEWIS-10397	B68-10270 05
			<b>GROOVING</b> Shallow grooves in journal improve air bearing performance LEWIS-10396	B68-10134 05
			Preparing rock powder specimens of controlled size distribution NPD-10007	B68-10297 05
			<b>GROUND EFFECT MACHINES</b> Air Bearing Lift Pad /ABLP/ M-FS-14685	B68-10442 05
			<b>GROUND SUPPORT EQUIPMENT</b> Tube joint leak repair coupling MSC-15022	B68-10540 05
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			Compound equation developed for postnatal growth of birds and mammals ARG-10192	B68-10427 04
			<b>GUIDANCE (MOTION)</b> Closed circuit TV system automatically guides welding arc M-FS-20084	B68-10357 01
			<b>GYRATORS</b> Gyrator-type circuits replace ungrounded inductors XAC-10608	B68-10084 01
			<b>GYROSCOPES</b> Squeeze-film gas bearing technology M-FS-14821	B68-10180 05
			Laser system used for dynamic balancing of gyros M-FS-12218	B68-10225 05
			Improved gas ring laser MSC-11584	B68-10304 02
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			<b>HAIL</b> Simulated hailstone fabrication and use in testing weatherability of structures NPD-10783	B68-10552 03
			<b>HALL EFFECT</b> System measures arc energy dissipated in relay contact cycling M-FS-14541	B68-10312 01
			<b>HALOGEN COMPOUNDS</b> Fire retardant foams developed to suppress fuel fires ARC-10098	B68-10358 03

# HALOGENATION

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## HALOGENATION

Fire retardant foams developed to suppress  
fuel fires  
ARC-10098 B68-10358 03

## HAMMERS

Versatile impact hand tool  
M-FS-20140 B68-10371 05

## HAMSTERS

Study of radiation effects on mammalian cells  
in vitro  
ARG-10191 B68-10294 02

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Training manuals for nondestructive testing  
using magnetic particles  
M-FS-20187 B68-10391 03

Contamination control handbook  
M-FS-20185 B68-10392 03

Failure rates for accelerated acceptance  
testing of silicon transistors  
ERC-10198 B68-10541 01

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Harmonic distortion analyzer speeds setup of  
magnetic tape recorders  
GSFC-10198 B68-10254 01

## HARMONIC FUNCTIONS

Large-amplitude inviscid fluid motion in an  
accelerating container  
MSC-11560 B68-10170 02

## HARMONIC OSCILLATORS

Synthesis of electro-optic modulators for  
amplitude modulation of light  
M-FS-14268 B68-10275 02

## HASTELLOY (TRADEMARK)

Hastelloy X properties, data, and  
metallurgical characteristics  
NUC-10302 B68-10023 03

## HAZARDS

Chemistry laboratory safety manual  
available  
SAN-10030 B68-10419 03

Ambient temperature catalyst for hydrogen  
ignition  
LEWIS-10551 B68-10520 03

## HEART FUNCTION

Cardiac R-wave detector  
LEWIS-10394 B68-10144 01

## HEAT BALANCE

Electronic calorimetric computer  
LEWIS-90254 B68-10138 01

## HEAT EXCHANGERS

Concept to comfort-condition subjects  
wearing restrictive clothing  
MSC-10964 B68-10178 02

## HEAT GENERATION

Cooling of 2 kW H subscript 2-0 subscript 2  
fuel cell  
M-FS-13737 B68-10544 01

## HEAT MEASUREMENT

Twin solution calorimeter determines  
heats of formation of alloys at high  
temperatures  
ARG-10114 B68-10083 01

Steady-state differential calorimeter  
measures gamma heating in reactor  
ARG-10120 B68-10182 01

A mass flux probe for measurement in a  
supersonic stream  
LEWIS-10695 B68-10533 02

## HEAT OF FORMATION

Twin solution calorimeter determines

heats of formation of alloys at high  
temperatures  
ARG-10114 B68-10083 01

One-dimensional reacting gas nonequilibrium  
performance program  
MSC-11777 B68-10375 06

## HEAT OF VAPORIZATION

Cooling of 2 kW H subscript 2-0 subscript 2  
fuel cell  
M-FS-13737 B68-10544 01

## HEAT RESISTANT ALLOYS

Cobalt-tungsten, ferromagnetic  
high-temperature alloy  
LEWIS-10378 B68-10095 03

Manual of industrial diamonds plus dressing  
and grinding criteria for machining  
superalloys  
M-FS-14582 B68-10239 05

Nickel base alloy with improved stress  
rupture properties  
LEWIS-10283 B68-10344 03

Tungsten fiber-reinforced nickel superalloy  
LEWIS-10424 B68-10369 03

Nickel-base superalloy\*s excellent  
properties promote its service to 2200  
degrees F  
LEWIS-10355 B68-10380 03

## HEAT SINKS

Method of disjoining adhesively bonded  
electronic cordwood modules  
MSC-12060 B68-10086 01

Transistorized Marx bank pulse circuit  
provides voltage multiplication with  
nanosecond rise-time  
ARG-10110 B68-10328 01

Heat-load simulator for heat sink design  
MSC-15170 B68-10510 02

High conductance vapor thermal switch  
GSFC-10109 B68-10519 02

## HEAT SOURCES

Pyrotechnic device provides one-shot  
heat source  
LEWIS-10131 B68-10062 03

Electrochemical cell has internal resistive  
heater element  
GSFC-10358 B68-10325 01

## HEAT TRANSFER

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their measurement, a study  
M-FS-14696 B68-10240 02

Characteristics of fluidized-packed beds  
ARG-10049 B68-10278 03\*

Thermal conductivity and dielectric constant  
of silicate materials  
M-FS-14856 B68-10351 03

Analysis of annular combustors  
LEWIS-10399 B68-10356 06

Rating of electrical wires in vacuum  
environments  
MSC-15108 B68-10362 01

An investigation of particle mixing in a  
gas-fluidized bed  
ARG-10182 B68-10407 05

Solving nonlinear heat transfer constant  
area fin problems  
M-FS-14851 B68-10504 02

Cooling of 2 kW H subscript 2-0 subscript 2  
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## HIGH STRENGTH ALLOYS

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M-FS-14808	B68-10396	02	ARC-10083	B68-10065	01
Heat transfer coefficients for liquid hydrogen turbopumps			Conceptual hermetically sealed elbow actuator		
M-FS-18345	B68-10517	02	M-FS-14710	B68-10300	05
<b>HEAT TRANSMISSION</b>			<b>HETERODYNING</b>		
Solution of differential equations by application of transformation groups			Laser Doppler gas-velocity instrument		
M-FS-14802	B68-10276	02	M-FS-20039	B68-10349	02
Dynamics of moving bubbles in single and binary component systems			<b>HIGH FREQUENCIES</b>		
M-FS-14845	B68-10339	02	Moebius resistor is noninductive and nonreactive		
Computer program TRACK performs transient and/or steady state thermal analysis with coupled fluid flow and heat conduction			SAN-10020	B68-10267	01
NUC-10189	B68-10450	06	Cooled miniature pressure transducers effective at high temperatures		
Solving nonlinear heat transfer constant area fin problems			LEWIS-10401	B68-10370	01
M-FS-14851	B68-10504	02	Effects of high frequency current in welding aluminum alloy 6061		
<b>HEAT TREATMENT</b>			M-FS-18337	B68-10383	05
Heat treatment procedure to increase ductility of degraded nickel alloy			<b>HIGH PASS FILTERS</b>		
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## HIGH TEMPERATURE

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NUC-10304 B68-10024 05

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NPO-10233 B68-10316 01

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M-FS-14691 B68-10309 01

Color-televised medical microscopy  
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Improvement in recording and reading holograms  
ERC-10151 B68-10347 02

FORTTRAN optical lens design program  
NPO-10603 B68-10354 06

UV detector monitors organic contamination of optical surfaces  
M-FS-20246 B68-10413 01

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## LIBRARIES

JPKWIC - General key word in context and subject index report generator  
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## LIE GROUPS

Solution of differential equations by application of transformation groups  
M-FS-14802 B68-10276 02

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M-FS-14248 B68-10126 02

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MSC-11584 B68-10304 02

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NPO-10238 B68-10502 01

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## LUBRICATION SYSTEMS

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minimized by minor elements  
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in tensile specimens  
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from nickel alloys  
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permeability of sintered powdered metals  
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M-FS-20140 B68-10371 05

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## MAGNESIUM ALLOYS

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## MAGNESIUM OXIDES

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prepared from magnesium-24 oxide  
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prevents overtorquing  
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M-FS-14134	B68-10075	05	LEWIS-10296	B68-10441	05
<b>MAINTENANCE</b>			Environmental test planning, selection and standardization aids available		
Maintainability methodology and maintenance analyses			SAN-10028	B68-10445	06
M-FS-14134	B68-10075	05	Rocket engine analog simulation		
Tube joint leak repair coupling			M-FS-14511	B68-10511	01
MSC-15022	B68-10540	05	Integrated metal transistor leads		
<b>MAMMALS</b>			GSFC-90536	B68-10518	01
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ARG-10192	B68-10427	04	M-FS-16196	B68-10530	05
<b>MANDRELS</b>			<b>MASS RATIOS</b>		
Compressible sleeve provides automatic centering for grinding or turning of cylinders			Advances in light-gas gun technology		
SAN-10021	B68-10318	05	M-FS-14270	B68-10288	05
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Manganese-alumina-ceramic glass eliminates rigid controls necessary in bonding metals to ceramics			Effects of surface preparation on quality of aluminum alloy weldments		
SAN-10012	B68-10204	03	M-FS-13152	B68-10302	03
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Improved electromechanical master-slave manipulator			An investigation of particle mixing in a gas-fluidized bed		
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## METEOROID HAZARDS

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## METHYL ALCOHOLS

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## MICA

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M-FS-14309 B68-10546 02

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## MICROELECTRONICS

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## MICROFILMS

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## MICROINSTRUMENTATION

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## MICROMETEORIDS

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## MICROMINIATURIZATION

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## MICROMINIATURIZED ELECTRONIC DEVICES

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M-FS-13621 B68-10073 01

## MICROORGANISMS

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SAN-10003 B68-10231 04

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## MICROPARTICLES

Vacuum probe sampler removes micron-sized particles from surfaces  
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## MICROPHONES

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FRC-10031 B68-10233 01

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M-FS-15016 B68-10529 01

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NPO-10007 B68-10297 05

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M-FS-20175 B68-10536 03

## MICROSTRUCTURE

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M-FS-18174 B68-10285 03

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ARG-10181 B68-10455 03

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## MICROWAVE RESONANCE

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## MICROWAVE TRANSMISSION

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M-FS-14691 B68-10309 01

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NPO-10548 B68-10244 01

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NPO-10007 B68-10297 05

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Thread cutting with 3-axis N/C milling machine			LANGLEY-10033	B68-10132	05
LANGLEY-10017	B68-10055	06	Standards for compatibility of printed circuit and component lead materials		
<b>MINERAL OILS</b>			M-FS-14531	B68-10310	01
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NPO-10007	B68-10297	05	ARG-10200	B68-10408	03
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Silicon strain sensors enable pressure measurement at cryogenic temperatures			ARG-10205	B68-10409	03
M-FS-14703	B68-10262	01	<b>MOLTEN SALT ELECTROLYTES</b>		
<b>MINIATURIZATION</b>			Lithium-tellurium bimetallic cell has increased voltage		
Miniature pressure transducer for stressed member application			ARG-10141	B68-10400	01
MSC-11869	B68-10246	01	<b>MOLYBDENUM</b>		
High-speed pulse camera			Lightweight heater generates high temperatures from low current		
MSC-11353	B68-10329	02	SAN-10004	B68-10223	01
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Color-televised medical microscopy			<b>MOLYBDENUM DISULFIDES</b>		
MSC-13086	B68-10314	01	One hundred angstrom niobium wire		
Modified sine bar device measures small angles with high accuracy			LEWIS-10128	B68-10279	03
GSFC-438	B68-10322	02	Application of the solid lubricant molybdenum disulfide by sputtering		
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M-FS-20246	B68-10413	01	<b>MOMENTS</b>		
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NPO-10547	B68-10338	05	<b>MOMENTUM TRANSFER</b>		
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ARG-10182	B68-10407	05	M-FS-14270	B68-10288	05
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ARG-10027	B68-10372	05	GSFC-90549	B68-10002	01
<b>MODAL RESPONSE</b>			Monitor senses amount of contamination deposited on surfaces		
Computer program determines vibration in three-dimensional space of hydraulic lines excited by forced displacements			GSFC-10212	B68-10089	01
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## MONOSTABLE MULTIVIBRATORS

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<b>MONTE CARLO METHOD</b> Deep gamma ray penetration in thick shields M-FS-14388	B68-10143	02	Locating **sneak paths** in electrical circuitry M-FS-15018	B68-10565	01
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<b>MOSAICS</b> Selective video blanking technique M-FS-20013	B68-10434	01	Technique developed for measuring transmittance of optical birefringent networks M-FS-14267	B68-10260	02
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<b>MOUNTING</b> Piggy-back mounting would increase microcircuit packaging density MSC-12059	B68-10114	01	GERT EXCLUSIVE-OR combining paths and loops of electrical networks ERC-10206	B68-10435	06
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<b>MULTIPLICATION</b> Improved electromechanical master-slave manipulator ARG-10027	B68-10372	05	Resistivity measurements of neutron-irradiated pure metals and Al-Zn alloys ARG-10108	B68-10200	03
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<b>NICKEL</b>			LEWIS-10402	B68-10145	01
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LEWIS-10283	B68-10344	03	SAN-10012	B68-10204	03
<b>NICKEL ALLOYS</b>			<b>High-voltage pulse generator developed for wide-gap spark chambers</b>		
High strength nickel-base alloy with improved oxidation resistance up to 2200 degrees F			ARG-10136	B68-10283	01
LEWIS-10115	B68-10094	03	<b>Cryogenic liquid level measuring probe</b>		
Study reveals effect of aluminum on saturation moment of Fe-Ni alloys			ARG-10138	B68-10291	01
ARG-90259	B68-10172	03	<b>One-dimensional reacting gas nonequilibrium performance program</b>		
<b>Weld microfissuring in Inconel 718 minimized by minor elements</b>			MSC-11777	B68-10375	06
M-FS-18185	B68-10251	03	<b>One-dimensional two-phase reacting gas nonequilibrium performance program</b>		
<b>Inspection criteria ensure quality control of parallel gap soldering</b>			MSC-11780	B68-10376	06
M-FS-14530	B68-10257	05	<b>Axisymmetric reacting gas nonequilibrium performance program</b>		
<b>Pre-weld heat treatment improves welds in Rene 41</b>			MSC-11781	B68-10377	06
M-FS-18174	B68-10285	03	<b>Titanium-nitrogen reaction investigated for application to gettering systems</b>		
<b>Ultrasonic temperature measuring device</b>			ARG-10208	B68-10414	03
LEWIS-10446	B68-10319	01	<b>NOISE</b>		
<b>Tungsten fiber-reinforced nickel superalloy</b>			Simultaneous message framing and error detection		
LEWIS-10424	B68-10369	03	MSC-12001	B68-10330	01
<b>Nickel-base superalloy*s excellent properties promote its service to 2200 degrees F</b>			<b>NOISE (SOUND)</b>		
LEWIS-10355	B68-10380	03	Noise figure measurement concept for acoustic amplifiers		
<b>Method for removing surface-damaged layers from nickel alloys</b>			GSFC-10066	B68-10272	01
M-FS-18151	B68-10522	03	<b>NOISE METERS</b>		
<b>NICKEL CADMIUM BATTERIES</b>			Improved S/N meter		
Charge control of nickel-cadmium batteries by coulometer and third electrode method			MSC-11656	B68-10151	01
GSFC-10487	B68-10431	01	<b>NOISE REDUCTION</b>		
<b>NICKEL COMPOUNDS</b>			Digital filter suppresses effects of nonstatistical noise bursts on multichannel scaler digital averaging systems		
Application of the solid lubricant molybdenum disulfide by sputtering			ARG-90143	B68-10193	06
LEWIS-10544	B68-10340	03	<b>NONDESTRUCTIVE TESTS</b>		
<b>NIOBATES</b>			Dc pin-to-pin testing of integrated circuits		
Improved process for making thin-film sodium niobate capacitors			GSFC-10284	B68-10001	01
MSC-11231	B68-10163	01	<b>Gage monitors quality of cross-wire resistance welds</b>		
<b>NIOBIUM</b>			GSFC-90549	B68-10002	01
One hundred angstrom niobium wire					

## NONEQUILIBRIUM CONDITIONS

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Development of mechanized ultrasonic scanning system M-FS-13638	B68-10004	05	NONUNIFORMITY	Bimetal sensor averages temperature of nonuniform profile LEWIS-10362	B68-10007	01
Evaluation of methods for nondestructive testing of brazed joints ARG-90175	B68-10191	03	NORMAL DENSITY FUNCTIONS	Computer program determines exact two-sided tolerance limits for normal distributions M-FS-18045	B68-10158	06
Standards for compatibility of printed circuit and component lead materials M-FS-14531	B68-10310	01		Application of a truncated normal failure distribution in reliability testing M-FS-14328	B68-10179	02
Automatic, nondestructive test monitors in-process weld quality M-FS-14996	B68-10333	01	NOTCH TESTS	Effect of surface irregularities on bellows fatigue life M-FS-14480	B68-10229	05
Nondestructive test determines overload destruction characteristics of current limiter fuses XGS-08566	B68-10364	01	NOZZLE FLOW	Axisymmetric two-phase perfect gas performance program MSC-11774	B68-10374	06
Nondestructive method for measuring residual stresses in metals, a concept KSC-10237	B68-10378	03		One-dimensional two-phase reacting gas nonequilibrium performance program MSC-11780	B68-10376	06
Automatic system nondestructively monitors and records fatigue crack growth LANGLEY-10091	B68-10379	01	NOZZLE GEOMETRY	Venturi meter with separable diffuser LEWIS-10483	B68-10295	05
Training manuals for nondestructive testing using magnetic particles M-FS-20187	B68-10391	03		One-dimensional reacting gas nonequilibrium performance program MSC-11777	B68-10375	06
Nondestructive testing of brazed rocket engine components M-FS-18191	B68-10394	03		One-dimensional two-phase reacting gas nonequilibrium performance program MSC-11780	B68-10376	06
Hydrostatic testing of porous assemblies M-FS-18298	B68-10439	05		Axisymmetric reacting gas nonequilibrium performance program MSC-11781	B68-10377	06
Rocket engine analog simulation M-FS-14511	B68-10511	01	NOZZLES	Miniature paint-spray gun for recessed areas MSC-13060	B68-10387	05
Failure rates for accelerated acceptance testing of silicon transistors ERC-10198	B68-10541	01		System for measuring spatial distribution of ejected droplets, a concept NPO-10185	B68-10402	01
NONEQUILIBRIUM CONDITIONS			NUCLEAR EXPLOSIONS	Rapid-response, light-exposure control system NPO-10238	B68-10502	01
ELAS - A general purpose computer program for the equilibrium problems of linear structures NPO-10598	B68-10187	06	NUCLEAR FUEL ELEMENTS	Glassy materials investigated for nuclear reactor applications ARG-10075	B68-10103	03
One-dimensional reacting gas nonequilibrium performance program MSC-11777	B68-10375	06	NUCLEAR FUELS	Technological survey of tellurium and its compounds ARG-10119	B68-10201	03
Axisymmetric reacting gas nonequilibrium performance program MSC-11781	B68-10377	06		Characteristics of fluidized-packed beds ARG-10049	B68-10278	03
NONEQUILIBRIUM FLOW				Consolidation and fabrication techniques for vanadium-20 w/o titanium /TV-20/ ARG-10148	B68-10368	03
One-dimensional two-phase reacting gas nonequilibrium performance program MSC-11780	B68-10376	06	NUCLEAR MAGNETIC RESONANCE	The preparation, identification and properties of chlorophyll derivatives ARG-10205	B68-10409	03
NONLINEAR EQUATIONS			NUCLEAR PHYSICS	Ignition of binary alloys of uranium ARG-10057	B68-10280	01
Solution of differential equations by application of transformation groups M-FS-14802	B68-10276	02	NUCLEAR POWER REACTORS	Electronic calorimetric computer LEWIS-90254	B68-10138	01
NONLINEAR SYSTEMS						
Computer program offers new method for constructing periodic orbits in nonlinear dynamical systems M-FS-14654	B68-10217	06				
NONLINEARITY						
New technique for optimal smoothing of data MSC-11354	B68-10060	02				
Vibration testing and dynamic studies of relays M-FS-14542	B68-10268	01				
Low-cost, fast-response drive circuit for electromagnetic torque motors LEWIS-10143	B68-10386	01				

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## OPTICAL EQUIPMENT

## NUCLEAR REACTIONS

An economical method for the continuous production of iodine-123  
LEWIS-10518 B68-10433 03

## NUCLEAR REACTORS

Glassy materials investigated for nuclear reactor applications  
ARG-10075 B68-10103 03

Steady-state differential calorimeter measures gamma heating in reactor  
ARG-10120 B68-10182 01

Portable, high intensity isotopic neutron source provides increased experimental accuracy  
ARG-90250 B68-10243 02

## NUCLEAR ROCKET ENGINES

Ultrasonic temperature measuring device  
LEWIS-10446 B68-10319 01

## NUCLEATE BOILING

Evaluation of superconducting magnets, a study  
M-FS-14808 B68-10396 02

## NUCLEATION

Analytical techniques for determining boron in graphite  
ARG-10087 B68-10102 03

Electron beam recrystallization of amorphous semiconductor materials  
LEWIS-10443 B68-10556 02

## NUCLEI

Stratification of centrifuged amoeba nuclei investigated by electron microscopy  
ARG-10161 B68-10366 04

## NUCLEI (NUCLEAR PHYSICS)

Four pi-recoil proportional counter used as neutron spectrometer  
ARG-10101 B68-10326 02

## NUMERICAL ANALYSIS

Large-amplitude inviscid fluid motion in an accelerating container  
MSC-11560 B68-10170 02

Computer program determines system stability /DIGSTA/  
LEWIS-10395 B68-10216 06

## NUMERICAL CONTROL

Thread cutting with 3-axis N/C milling machine  
LANGLEY-10017 B68-10055 06

Numerical Control Machine Data Manual  
M-FS-14342 B68-10080 05

Accurate digital technique simulates flight control system  
M-FS-14787 B68-10569 02

## NUMERICAL INTEGRATION

Computer program determines exact two-sided tolerance limits for normal distributions  
M-FS-18045 B68-10158 06

Computer program analyzes Buckling Of Shells Of Revolution with various wall construction, BOSOR  
LANGLEY-10290 B68-10226 06

CIRCUS--A digital computer program for transient analysis of electronic circuits  
M-FS-15002 B68-10416 06

## NUTRITION

Experimental study and evaluation of radioprotective drugs  
ARG-10196 B68-10320 04

Compound equation developed for postnatal growth of birds and mammals

ARG-10192 B68-10427 04

## NUTRITIONAL REQUIREMENTS

Food products for space applications  
MSC-11697 B68-10324 04

## NUTS (FASTENERS)

Tensile testing grips ensure uniform loading of bimetal tubing specimens  
LEWIS-10267 B68-10248 05

High-torque power wrench, a concept  
M-FS-18194 B68-10299 05

## O RING SEALS

Cooled miniature pressure transducers effective at high temperatures  
LEWIS-10401 B68-10370 01

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New method for critical failure prediction of complex systems  
M-FS-14133 B68-10252 02

Computer graphics data conditioning  
M-FS-14695 B68-10296 06

Charts designate probable future oceanographic research fields  
M-FS-20202 B68-10397 01

Analysis of filament reinforced metal-shell pressure vessels  
LEWIS-10352 B68-10405 06

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Conceptual apparatus for detecting leaks of nonconductive liquids  
M-FS-14713 B68-10303 01

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Computer graphics data conditioning  
M-FS-14695 B68-10296 06

## ONE DIMENSIONAL FLOW

One-dimensional reacting gas nonequilibrium performance program  
MSC-11777 B68-10375 06

## OPERATING TEMPERATURE

Liquid crystal calibrator  
M-FS-14151 B68-10221 03

## OPERATIONAL PROBLEMS

Electrochemical cell has internal resistive heater element  
GSFC-10358 B68-10325 01

## OPTICAL COMMUNICATION

Site survey for optimum location of Optical Communication Experimental Facility  
M-FS-13155 B68-10050 06

Repetitively pulsed, wavelength-selective carbon dioxide laser  
ERC-10178 B68-10564 02

## OPTICAL EQUIPMENT

Optical system facilitates inspection of printed circuit boards  
GSFC-07971 B68-10021 02

Antiglare improvement for optical imaging systems  
NPD-10337 B68-10090 02

Circuit enhances vertical resolution in raster scanning systems  
MSC-12123 B68-10121 01

Optical integrating sphere operates at visible and infrared wavelengths  
M-FS-14248 B68-10126 02

Improved relay optical element for spectroradiometer using cryogenically cooled detector



## OPTICAL MEASUREMENT

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MSC-11688	B68-10245	02	HICDV /Newton-Raphson calculus of variation with automatic transversalities/		
Modified sine bar device measures small angles with high accuracy			M-FS-14468	B68-10232	06
GSFC-438	B68-10322	02	Silicon strain sensors enable pressure measurement at cryogenic temperatures		
FORTTRAN optical lens design program			M-FS-14703	B68-10262	01
NPO-10603	B68-10354	06	Computer program analyzes and designs supersonic wing-body combinations		
Training manual on optical alignment instruments			ARC-10141	B68-10335	06
M-FS-20292	B68-10574	02	Study of optimum discrete estimators in measurement analysis		
OPTICAL MEASUREMENT			M-FS-14915	B68-10348	02
Improved optical diffractometer					
MSC-12055	B68-10071	02	FORTTRAN optical lens design program		
OPTICAL MEASURING INSTRUMENTS			NPO-10603	B68-10354	06
Optimetric system facilitates colorimetric and fluorometric measurements			Single degree of freedom antenna pointing program /ANTENA/		
NPO-10233	B68-10316	01	NPO-10756	B68-10449	06
Detection of effect of deposits on optical windows of pyrometer measurements			Computer program for parameter optimization		
LEWIS-10366	B68-10367	01	ARC-10168	B68-10453	06
OPTICAL MICROSCOPES			Radial inflow turbine design charts		
Color-televised medical microscopy			LEWIS-10720	B68-10567	05
MSC-13086	B68-10314	01	ORBITAL MECHANICS		
OPTICAL PROPERTIES			Generalized Newton-Raphson trajectory optimization-generator 1		
Properties of optics at high temperature and their measurement, a study			M-FS-15020	B68-10422	06
M-FS-14696	B68-10240	02	ORBITAL RENDEZVOUS		
UV detector monitors organic contamination of optical surfaces			Generalized Newton-Raphson trajectory optimization-generator 1		
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M-FS-20088	B68-10571	02	Feasibility study of wireless power transmission systems		
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M-FS-14791	B68-10311	01	Computer program offers new method for constructing periodic orbits in nonlinear dynamical systems		
OPTICAL TRACKING			M-FS-14654	B68-10217	06
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M-FS-14791	B68-10311	01	Nitric acid-organic mixtures surveyed for use in separation by anion exchange methods		
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New camera tube improves ultrasonic inspection system			ORIFICES		
ARG-90237	B68-10088	01	Pressure variable orifice for hydraulic control valve		
Properties of optics at high temperature and their measurement, a study			MSC-11323	B68-10120	05
M-FS-14696	B68-10240	02	Vacuum probe sampler removes micron-sized particles from surfaces		
Improved relay optical element for spectroradiometer using cryogenically cooled detector			SAN-10003	B68-10231	04
MSC-11688	B68-10245	02	Dual rate pressure relief valve		
Fluorescent particles enable visualization of gas flow			MSC-11606	B68-10237	05
M-FS-14583	B68-10259	02	ORTHOTROPIC SHELLS		
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UV detector monitors organic contamination of optical surfaces			OSCILLATING CYLINDERS		
M-FS-20246	B68-10413	01	Large-amplitude inviscid fluid motion in an accelerating container		
OPTIMAL CONTROL			MSC-11560	B68-10170	02
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MSC-11554	B68-10234	02	Suspended chains damp wind-induced oscillations of tall flexible structures		
OPTIMIZATION			LANGLEY-10193	B68-10042	05
Automatic planning concept - An analysis of optimum scheduling			Device damps fluid pressure oscillations in vent valve		
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M-FS-14105	B68-10222	05			

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GSFC-10183 B68-10054 01

Power consumption in acoustic amplifiers  
under conditions of maximum stable gain  
GSFC-10067 B68-10327 01

## OSCILLATORS

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MSC-11825 B68-10289 01

Dynamic linearity measurement technique  
KSC-10186 B68-10290 01

Cryogenic liquid level measuring probe  
ARG-10138 B68-10291 01

Improved gas ring laser  
MSC-11584 B68-10304 02

Communication system features dual mode  
range acquisition plus time delay  
measurement  
M-FS-14323 B68-10306 01

Laser Doppler gas-velocity instrument  
M-FS-20039 B68-10349 02

A 35 GHz solid state transmitter/driver  
M-FS-20152 B68-10545 01

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Nondestructive test determines overload  
destruction characteristics of current  
limiter fuses  
XGS-08566 B68-10364 01

## OSCILLOSCOPES

System measures arc energy dissipated in  
relay contact cycling  
M-FS-14541 B68-10312 01

Nondestructive test determines overload  
destruction characteristics of current  
limiter fuses  
XGS-08566 B68-10364 01

System measures response time of  
photomultiplier tubes  
LEWIS-10437 B68-10382 01

Method for measuring alternator voltage  
transients  
LEWIS-10373 B68-10513 01

## OUTPUT

Tool reconstructs data input points  
corresponding to first order output graph  
M-FS-18003 B68-10154 02

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MSC-11600 B68-10241 01

## OVERVOLTAGE

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sensitive circuits, other meters  
SAN-10013 B68-10269 01

Current-limiting voltage regulator  
MSC-11824 B68-10305 01

Transistorized Marx bank pulse circuit  
provides voltage multiplication with  
nanosecond rise-time  
ARG-10110 B68-10328 01

Nondestructive test determines overload  
destruction characteristics of current  
limiter fuses  
XGS-08566 B68-10364 01

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Silicon oxide films grown in microwave  
discharge  
M-FS-14634 B68-10171 01

Studies in zirconium oxidation  
ARG-10099 B68-10199 03

Manganese-alumina-ceramic glass eliminates  
rigid controls necessary in bonding metals  
to ceramics  
SAN-10012 B68-10204 03

Preparation of silver-activated zinc sulfide  
thin films  
GSFC-10687 B68-10271 03

Ignition of binary alloys of uranium  
ARG-10057 B68-10280 01

Precise doping of metals by small gas flows  
LEWIS-10444 B68-10526 03

## OXIDATION RESISTANCE

Reinforced thermal-shock resistant ceramics  
LEWIS-10376 B68-10085 03

High strength nickel-base alloy with  
improved oxidation resistance up to 2200  
degrees F  
LEWIS-10115 B68-10094 03

High-temperature bearing lubricants  
LEWIS-10408 B68-10249 05

High temperature alloy  
LEWIS-10377 B68-10253 03

Nickel base alloy with improved stress  
rupture properties  
LEWIS-10283 B68-10344 03

Tungsten fiber-reinforced nickel superalloy  
LEWIS-10424 B68-10369 03

Nickel-base superalloy\*s excellent  
properties promote its service to 2200  
degrees F  
LEWIS-10355 B68-10380 03

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ARG-10057 B68-10280 01

Between-bearing shaft seal, a concept  
M-FS-18179 B68-10286 05

## OXYGEN

Evaluation of ignition mechanisms in  
selected nonmetallic materials  
MSC-11645 B68-10167 03

Saran film is fire-retardant in oxygen  
atmosphere  
MSC-11604 B68-10177 03

Zinc-oxygen primary cell yields high  
energy density  
M-FS-14661 B68-10218 01

Improved fuel-cell-type hydrogen sensor  
M-FS-14656 B68-10263 01

Rating of electrical wires in vacuum  
environments  
MSC-15108 B68-10362 01

One-dimensional reacting gas nonequilibrium  
performance program  
MSC-11777 B68-10375 06

One-dimensional two-phase reacting gas  
nonequilibrium performance program  
MSC-11780 B68-10376 06

Axisymmetric reacting gas nonequilibrium  
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MSC-11781 B68-10377 06

Precise doping of metals by small gas flows  
LEWIS-10444 B68-10526 03

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measured by etch decoration  
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<b>PETROGRAPHY</b>			M-FS-14791	B68-10311	01
Preparing rock powder specimens of controlled size distribution			<b>PHOTOCONDUCTIVITY</b>		
NPD-10007	B68-10297	05	Improved radiographic image amplifier panel		
<b>PH</b>			M-FS-14522	B68-10363	02
Hydrogen peroxide etching proves useful for germanium			Integrated metal transistor leads		
ARG-10170	B68-10454	03	GSFC-90536	B68-10518	01
<b>PHASE DEVIATION</b>			<b>PHOTODIODES</b>		
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MSC-11584	B68-10304	02	M-FS-20013	B68-10434	01
<b>PHASE ERROR</b>			<b>PHOTOELECTRIC CELLS</b>		
Method of reducing time base error in digital magnetic recorders			High-speed camera synchronization		
GSFC-10108	B68-10317	01	M-FS-18062	B68-10282	02
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Improved phase locked loop receiver			MSC-10966	B68-10521	02
GSFC-09561	B68-10008	01	<b>PHOTOELECTRIC EMISSION</b>		
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XGS-01222	B68-10068	01	<b>PHOTOGRAPHIC EQUIPMENT</b>		
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			LEWIS-10382	B68-10343	05

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Improved molding process ensures plastic parts of higher tensile strength LANGLEY-10033	B68-10132	05	<b>POISONING</b> Product identification techniques used as training aids for analytical chemists SAN-10025	B68-10373	03
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<b>PLASTISOLS</b> Compressible sleeve provides automatic centering for grinding or turning of cylinders SAN-10021	B68-10318	05	<b>POLARIZED LIGHT</b> Synthesis of electro-optic modulators for amplitude modulation of light M-FS-14268	B68-10275	02
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<b>PLATING</b> Ion plating technique improves thin film deposition SAN-10006	B68-10212	03	<b>POLLUTION</b> New method for critical failure prediction of complex systems M-FS-14133	B68-10252	02
<b>PLATINUM</b> Method of maintaining activity of hydrogen-sensing platinum electrode M-FS-1422	B68-10049	03	<b>POLYCRYSTALS</b> Grain-boundary migration in KCl bicrystals ARG-10181	B68-10455	03
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## POLYESTERS

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## POLYESTERS

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## POLYMERIC FILMS

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high temperature areas  
MSC-10285 B68-10277 05

## POLYMERS

Improved fuel-cell-type hydrogen sensor  
M-FS-14656 B68-10263 01

Temperature or pressure controller  
LEWIS-10297 B68-10337 01

## POLYNOMIALS

Simultaneous message framing and error  
detection  
MSC-12001 B68-10330 01

## POLYPHENYL ETHER

High-temperature bearing lubricants  
LEWIS-10408 B68-10249 05

## POLYSTYRENE

Fast-response cup anemometer features  
cosine response  
ARG-90193 B68-10202 01

## POLYTETRAFLUOROETHYLENE

Bearings use dry self-lubricating cage  
materials  
LEWIS-10432 B68-10165 05

## POLYURETHANE FOAM

Locating and sealing air leaks in  
multiroomed buildings  
NUC-10304 B68-10024 05

Fire retardant foams developed to suppress  
fuel fires  
ARC-10098 B68-10358 03

Fiberglass prevents cracking of  
polyurethane foam insulation on cryogenic  
vessels  
M-FS-20058 B68-10406 02

## POLYURETHANE RESINS

Compressible sleeve provides automatic  
centering for grinding or turning of  
cylinders  
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## POROSITY

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investigated  
M-FS-13649 B68-10192 03

Grain growth inhibitor for porous tungsten  
materials  
LEWIS-10535 B68-10527 03

Method for controlling density and  
permeability of sintered powdered metals  
LEWIS-10393 B68-10528 03

## POROUS MATERIALS

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filters  
LEWIS-10162 B68-10331 05

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M-FS-18298 B68-10439 05

Method for controlling density and  
permeability of sintered powdered metals  
LEWIS-10393 B68-10528 03

## POSITION (LOCATION)

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multiroomed buildings  
NUC-10304 B68-10024 05

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imbedded in nonmetallic structures  
M-FS-14790 B68-10183 01

Study of optimum discrete estimators in  
measurement analysis  
M-FS-14915 B68-10348 02

## POSITIONING

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guides welding arc  
M-FS-20084 B68-10357 01

## POSITIONING DEVICES (MACHINERY)

X-ray film holder permits single  
continuous picture of tubing joint  
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Remotely operated gripper provides vertical  
control rod movement  
ARG-10160 B68-10359 05

High-torque precision stepping drive  
M-FS-14772 B68-10549 05

## POTASSIUM CHLORIDES

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ARG-10181 B68-10455 03

## POTASSIUM CHROMATES

A rapid stress-corrosion test for aluminum  
alloys  
M-FS-20175 B68-10536 03

## POTENTIAL FLOW

Acoustic wave analysis  
M-FS-18076 B68-10265 02

## POTENTIOMETERS (INSTRUMENTS)

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M-FS-14456 B68-10573 05

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checkout of an analog computer  
M-FS-13969 B68-10576 06

## POTENTIOMETERS (RESISTORS)

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potentiometer life  
ARC-10060 B68-10175 01

## POTTING COMPOUNDS

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electronic cordwood modules  
MSC-12060 B68-10086 01

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compound combinations  
MSC-12074 B68-10157 01

Astronaut space suit communication antenna  
MSC-12101 B68-10238 01

## POWDER (PARTICLES)

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controlled size distribution  
NPO-10007 B68-10297 05

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of silicate materials  
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## POWDER METALLURGY

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## POWER GAIN

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under conditions of maximum stable gain  
GSFC-10067 B68-10327 01

## POWER SUPPLIES

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M-FS-18194 B68-10299 05

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High-efficiency step-up regulator M-FS-20049	B68-10432	01	
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<b>PRESSURE SENSORS</b>			
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<b>PROTOTYPES</b> Precision bolometer bridge MSC-11473	B68-10156	01	<b>PULSES</b> Ultrasonic temperature measuring device LEWIS-10446	B68-10319	01
<b>PSEUDONOISE</b> Acquisition of pseudonoise signals by sequential estimation M-FS-13898	B68-10258	01	<b>PUMICE</b> Thermal conductivity and dielectric constant of silicate materials M-FS-14856	B68-10351	03
Communication system features dual mode range acquisition plus time delay measurement M-FS-14323	B68-10306	01	<b>PUNCHED CARDS</b> Fully automatic telemetry data processor GSFC-10576	B68-10336	01
<b>PULLING</b> Indium adhesion provides quantitative measure of surface cleanliness SAN-10024	B68-10342	01	<b>PUNCHES</b> Versatile impact hand tool M-FS-20140	B68-10371	05
<b>PULSE AMPLITUDE</b> One-shot pulse shaper circuit XGS-11379	B68-10012	01	<b>PURGING</b> Between-bearing shaft seal, a concept M-FS-18179	B68-10286	05
Nondestructive test determines overload destruction characteristics of current limiter fuses XGS-08566	B68-10364	01	<b>PUSH-PULL AMPLIFIERS</b> Low-cost, fast-response drive circuit for electromagnetic torque motors LEWIS-10143	B68-10386	01
<b>PULSE CODE MODULATION</b> Portable Pulse Code Modulation /PCM/ MSC-11369	B68-10106	01	Fluidic analog amplifier ERC-10102	B68-10538	05
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## PYROMETERS

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## PYROMETERS

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LEWIS-10366 B68-10367 01

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LEWIS-10131 B68-10062 03

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XNP-10849 B68-10535 05

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## Q FACTORS

Active RC networks of low sensitivity for integrated circuit transfer function synthesis  
ARC-10146 B68-10210 01

## QUALITATIVE ANALYSIS

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M-FS-14542 B68-10268 01

## QUALITY CONTROL

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GSFC-10283 B68-10035 05

Inspection criteria ensure quality control of parallel gap soldering  
M-FS-14530 B68-10257 05

Standards for compatibility of printed circuit and component lead materials  
M-FS-14531 B68-10310 01

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M-FS-14996 B68-10333 01

Nondestructive test determines overload destruction characteristics of current limiter fuses  
XGS-08566 B68-10364 01

Consolidation and fabrication techniques for vanadium-20 w/o titanium /TV-20/  
ARG-10148 B68-10368 03

Training manuals for nondestructive testing using magnetic particles  
M-FS-20187 B68-10391 03

Nondestructive testing of brazed rocket engine components  
M-FS-18191 B68-10394 03

Environmental test planning, selection and standardization aids available  
SAN-10028 B68-10445 06

Electronic component reliability analysis by data reduction system  
NPO-10243 B68-10507 05

Failure rates for accelerated acceptance testing of silicon transistors  
ERC-10198 B68-10541 01

## QUANTITATIVE ANALYSIS

Microprobe investigation of brittle segregates in aluminum MIG and TIG welds  
M-FS-14720 B68-10334 03

Indium adhesion provides quantitative measure of surface cleanliness  
SAN-10024 B68-10342 01

## QUARTZ

Technique developed for measuring transmittance of optical birefringent networks  
M-FS-14267 B68-10260 02

Preparation of silver-activated zinc sulfide thin films  
GSFC-10687 B68-10271 03

Superconductive thin film makes convenient liquid helium level sensor  
LANGLEY-10289 B68-10341 01

Thermal conductivity and dielectric constant of silicate materials  
M-FS-14856 B68-10351 03

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## RADAR ANTENNAS

Structural thermal-control coatings  
NPO-10785 B68-10553 03

## RADAR TRACKING

Thermal conductivity and dielectric constant of silicate materials  
M-FS-14856 B68-10351 03

## RADIAL FLOW

Dynamics of moving bubbles in single and binary component systems  
M-FS-14845 B68-10339 02

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LEWIS-10720 B68-10567 05

## RADIANT COOLING

Graphite cloth facilitates vacuum evaporation of silicon monoxide  
M-FS-14764 B68-10256 03

## RADIANT FLUX DENSITY

Automatic solar lamp intensity control system  
XGS-10017 B68-10399 01

Plume radiation program  
M-FS-13202 B68-10447 06

## RADIATION

Improved atomic resonance gas cell for use in frequency standards  
MSC-11666 B68-10230 01

Analysis of annular combustors  
LEWIS-10399 B68-10356 06

## RADIATION ABSORPTION

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M-FS-20188 B68-10508 02

## RADIATION COUNTERS

Four pi-recoil proportional counter used as neutron spectrometer  
ARG-10101 B68-10326 02

## RADIATION DETECTORS

Improved relay optical element for spectroradiometer using cryogenically cooled detector  
MSC-11688 B68-10245 02

Automatic solar lamp intensity control system  
XGS-10017 B68-10399 01

Readout system for radiation detector  
MSC-90180 B68-10501 01

## RADIATION EFFECTS

Deep gamma ray penetration in thick shields  
M-FS-14388 B68-10143 02

Deflection circuit monitors force on object under water  
NUC-10147 B68-10147 01

Radiation effects on bacterial cells  
ARG-10064 B68-10169 04

Susceptibility of irradiated steels to hydrogen embrittlement  
ARG-10115 B68-10194 03

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ARG-10191 B68-10294 02

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Experimental study and evaluation of radioprotective drugs ARG-10196	B68-10320	04	<b>RADIO FREQUENCIES</b> Mm-wave power meter mount NPO-10348	B68-10152	01
CIRCUS--A digital computer program for transient analysis of electronic circuits M-FS-15002	B68-10416	06	Electrocardiograph transmitted by RF and telephone links in emergency situations FRC-10031	B68-10233	01
Rate constants measured for hydrated electron reactions with peptides and proteins ARG-10195	B68-10424	04	System converts optical phase changes to RF phase changes M-FS-20091	B68-10430	01
Plume radiation program M-FS-13202	B68-10447	06	<b>RADIO FREQUENCY INTERFERENCE</b> Improved S/N meter MSC-11656	B68-10151	01
Hydrogen peroxide etching proves useful for germanium ARG-10170	B68-10454	03	<b>RADIO TRANSMITTERS</b> Automatic patient respiration failure detection system with wireless transmission ARC-10174	B68-10365	01
<b>RADIATION MEASURING INSTRUMENTS</b> General computer program for calculation of radiation from inhomogeneous, nonisobaric, nonisothermal rocket exhaust plume M-FS-14314	B68-10044	06	<b>RADIOACTIVE ISOTOPES</b> Detection sensitivities in 3-8 MeV neutron activation ARG-10210	B68-10298	02
<b>RADIATION PROTECTION</b> Contamination control handbook M-FS-20185	B68-10392	03	An economical method for the continuous production of iodine-123 LEWIS-10518	B68-10433	03
<b>RADIATION SHIELDING</b> Graphite cloth facilitates vacuum evaporation of silicon monoxide M-FS-14764	B68-10256	03	<b>RADIOACTIVE MATERIALS</b> Improved electromechanical master-slave manipulator ARG-10027	B68-10372	05
Isotopically pure magnesium isotope-24 is prepared from magnesium-24 oxide ARG-10154	B68-10293	02	<b>RADIOBIOLOGY</b> Ceric and ferrous dosimeters show precision for 50-5000 rad range ARG-10173	B68-10426	02
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<b>RADIATION SOURCES</b> Silicon surface barrier detectors used for liquid hydrogen density measurement M-FS-14115	B68-10166	01	<b>RADIOGRAPHY</b> Evaluation of methods for nondestructive testing of brazed joints ARG-90175	B68-10191	03
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<b>RADII</b> Gimbal angle sensor GSFC-10305	B68-10315	01	<b>RANDOM ERRORS</b> Study of optimum discrete estimators in measurement analysis M-FS-14915	B68-10348	02
<b>RADIO ANTENNAS</b> Single degree of freedom antenna pointing program /ANTENA/ NPO-10756	B68-10449	06	<b>RANDOM PROCESSES</b> Random access-random release relay switching matrix M-FS-12590	B68-10301	01
<b>RADIO ASTRONOMY</b> Thermal conductivity and dielectric constant of silicate materials M-FS-14856	B68-10351	03	Study of optimum discrete estimators in measurement analysis M-FS-14915	B68-10348	02
<b>RADIO FILTERS</b> Improved S/N meter			<b>RANDOM VARIABLES</b> Independent doubly truncated gamma variables M-FS-20143	B68-10345	02

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## RANGE (EXTREMES)

Method for reducing snap in magnetic  
amplifiers  
LEWIS-10388 B68-10388 01

## RANGEFINDING

Communication system features dual mode  
range acquisition plus time delay  
measurement  
M-FS-14323 B68-10306 01

## RARE EARTH ELEMENTS

Crystal structure analysis of intermetallic  
compounds  
ARG-10092 B68-10198 03

## RAY TRACING

FORTTRAN optical lens design program  
NPO-10603 B68-10354 06

## RAYLEIGH SCATTERING

Improvement in recording and reading  
holograms  
ERC-10151 B68-10347 02

## RC CIRCUITS

Active RC networks of low sensitivity for  
integrated circuit transfer function  
synthesis  
ARC-10146 B68-10210 01

Active RC filter permits easy trade-off  
of amplifier gain and sensitivity to gain  
ARC-10042 B68-10539 01

## REACTANCE

Moebius resistor is noninductive and  
nonreactive  
SAN-10020 B68-10267 01

## REACTION KINETICS

Axisymmetric reacting gas nonequilibrium  
performance program  
MSC-11781 B68-10377 06

Titanium-nitrogen reaction investigated for  
application to gettering systems  
ARG-10208 B68-10414 03

Rate constants measured for hydrated  
electron reactions with peptides and  
proteins  
ARG-10195 B68-10424 04

## REACTION TIME

Reaction rates of graphite with ozone  
measured by etch decoration  
ARG-10086 B68-10101 03

Cryogenic liquid level measuring probe  
ARG-10138 B68-10291 01

System measures response time of  
photomultiplier tubes  
LEWIS-10437 B68-10382 01

Method for making small pointed  
thermocouples  
SAN-10014 B68-10389 01

## REACTION WHEELS

Gimbal angle sensor  
GSFC-10305 B68-10315 01

## REACTIVITY

Improved process for making thin-film sodium  
niobate capacitors  
MSC-11231 B68-10163 01

## REACTOR MATERIALS

Deflection circuit monitors force on object  
under water  
NUC-10147 B68-10147 01

## READERS

Long-term data storage and retrieval  
system, a concept  
M-FS-14789 B68-10505 01

## READOUT

Amplitude and frequency readout overlay  
GSFC-10183 B68-10054 01

Random access-random release relay  
switching matrix  
M-FS-12590 B68-10301 01

Improvement in recording and reading  
holograms  
ERC-10151 B68-10347 02

Readout system for radiation detector  
MSC-90180 B68-10501 01

## RECEIVERS

Improved phase locked loop receiver  
GSFC-09561 B68-10008 01

Diversity RF receiving system with  
improved phase-lock characteristics  
XGS-01222 B68-10068 01

Two-way digital driver/receiver uses one  
set of lines  
ERC-10055 B68-10437 01

## RECOIL PROTONS

Four pi-recoil proportional counter used as  
neutron spectrometer  
ARG-10101 B68-10326 02

## RECOMBINATION REACTIONS

Axisymmetric reacting gas nonequilibrium  
performance program  
MSC-11781 B68-10377 06

## RECORDING

Improvement in recording and reading  
holograms  
ERC-10151 B68-10347 02

## RECORDING INSTRUMENTS

Recharge unit provides for optimum  
recharging of battery cells  
GSFC-10688 B68-10273 01

## RECTIFIERS

Feasibility study of wireless power  
transmission systems  
M-FS-14691 B68-10309 01

## RECURSIVE FUNCTIONS

New technique for optimal smoothing of data  
MSC-11354 B68-10060 02

Study of optimum discrete estimators in  
measurement analysis  
M-FS-14915 B68-10348 02

## REDUCTION (CHEMISTRY)

Metabolic and toxicological effects of  
water-soluble xenon compounds are studied  
ARG-90239 B68-10076 04

Improved fuel-cell-type hydrogen sensor  
M-FS-14656 B68-10263 01

Isotopically pure magnesium isotope-24 is  
prepared from magnesium-24 oxide  
ARG-10154 B68-10293 02

## REDUNDANT COMPONENTS

SEAL /Subnetwork Enumeration And  
Listing/  
ERC-10116 B68-10227 06

## REENTRY SHIELDING

Fire retardant foams developed to suppress  
fuel fires  
ARC-10098 B68-10358 03

## REFLECTANCE

Optical integrating sphere operates at  
visible and infrared wavelengths  
M-FS-14248 B68-10126 02

Improved relay optical element for  
spectroradiometer using cryogenically

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# REPRODUCTION

cooled detector MSC-11688	B68-10245	02	RELEASING Pyrotechnic-actuated cable release XNP-10849	B68-10535	05
Detection of effect of deposits on optical windows of pyrometer measurements LEWIS-10366	B68-10367	01	RELIABILITY Application of a truncated normal failure distribution in reliability testing M-FS-14328	B68-10179	02
Structural thermal-control coatings NPO-10785	B68-10553	03	Temperature or pressure controller LEWIS-10297	B68-10337	01
Correction for losses in optical birefringent networks, a concept M-FS-20088	B68-10571	02	RELIABILITY ENGINEERING Electronic component reliability analysis by data reduction system NPO-10243	B68-10507	05
REFLECTING TELESCOPES Improved electro-optical tracking system M-FS-14791	B68-10311	01	Failure rates for accelerated acceptance testing of silicon transistors ERC-10198	B68-10541	01
REFLECTION Fluidic-thermochromic display device ERC-10031	B68-10350	01	RELIEF VALVES Vent and relief valve maintains low leakage rate over broad temperature range M-FS-12807	B68-10014	05
Automatic system nondestructively monitors and records fatigue crack growth LANGLEY-10091	B68-10379	01	Device damps fluid pressure oscillations in vent valve M-FS-13290	B68-10078	05
REFRACTION FORTRAN optical lens design program NPO-10603	B68-10354	06	Proposed gas generation assembly would recover deeply submerged objects SAN-10007	B68-10211	05
REFRACTORIES Laser Doppler gas-velocity instrument M-FS-20039	B68-10349	02	Dual rate pressure relief valve MSC-11606	B68-10237	05
REFRACTORY MATERIALS Decomposition vessel GSFC-10343	B68-10104	03	REMOTE CONTROL Portable, high intensity isotopic neutron source provides increased experimental accuracy ARG-90250	B68-10243	02
REFRACTORY METALS Survey made of refractory metals LEWIS-10380	B68-10032	03	Remotely operated gripper provides vertical control rod movement ARG-10160	B68-10359	05
Improved torch increases weld quality in refractory metals LEWIS-324	B68-10041	05	Improved electromechanical master-slave manipulator ARG-10027	B68-10372	05
Tungsten fiber-reinforced nickel superalloy LEWIS-10424	B68-10369	03	Pyrotechnic-actuated cable release XNP-10849	B68-10535	05
Inverted grounding technique for electron beam heating LEWIS-10543	B68-10411	01	Welding skate with computerized controls M-FS-20224	B68-10566	01
Precise doping of metals by small gas flows LEWIS-10444	B68-10526	03	REMOTE HANDLING Remotely installed pipe plug provides effective seal in hazardous environment NUC-10303	B68-10053	05
REINFORCED PLASTICS Fiberglass-reinforced structural materials for aerospace application M-FS-14806	B68-10360	03	Random access-random release relay switching matrix M-FS-12590	B68-10301	01
REINFORCEMENT (STRUCTURES) Method for reinforcing tubing joints MSC-11108	B68-10115	05	RENE 41 Heat treatment procedure to increase ductility of degraded nickel alloy M-FS-12410	B68-10029	03
REINFORCING FIBERS Tungsten fiber-reinforced nickel superalloy LEWIS-10424	B68-10369	03	Pre-weld heat treatment improves welds in Rene 41 M-FS-18174	B68-10285	03
RELATIONSHIPS Theory of a refined earth model M-FS-14679	B68-10228	02	REPETITION Transistorized Marx bank pulse circuit provides voltage multiplication with nanosecond rise-time ARG-10110	B68-10328	01
RELAXATION TIME One-dimensional reacting gas nonequilibrium performance program MSC-11777	B68-10375	06	REPORTS JPKWIC - General key word in context and subject index report generator NPO-10589	B68-10208	06
One-dimensional two-phase reacting gas nonequilibrium performance program MSC-11780	B68-10376	06	REPRODUCTION Study of radiation effects on mammalian cells in vitro		
RELAY Improved relay optical element for spectroradiometer using cryogenically cooled detector MSC-11688	B68-10245	02			

## REPRODUCTION (COPYING)

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ARG-10191	B68-10294	02	measure respiration rates accurately in adverse environments	B68-10188	01
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Shortened procedure for obtaining reproducible copies of 35 mm color slides			Nosepiece respiration monitor		
KSC-09957	B68-10560	02	ERC-10136	B68-10438	01
<b>RESEARCH FACILITIES</b>			<b>RESPIROMETERS</b>		
Hydrogen safety manual			Nosepiece respiration monitor		
LEWIS-10487	B68-10323	01	ERC-10136	B68-10438	01
<b>RESERVOIRS</b>			<b>RETAINING</b>		
Dynamic-reservoir lubricating device			High-temperature bearing-cage materials		
M-FS-14652	B68-10261	05	LEWIS-10403	B68-10176	05
<b>RESIDUAL STRESS</b>			<b>RETENTION</b>		
Electrochemical cell has internal resistive heater element			Study of behavior of sterols at interfaces		
GSFC-10358	B68-10325	01	ARG-10085	B68-10281	03
Nondestructive method for measuring residual stresses in metals, a concept			<b>REYNOLDS NUMBER</b>		
KSC-10237	B68-10378	03	Venturi meter with separable diffuser		
<b>RESILIENCE</b>			LEWIS-10483	B68-10295	05
Fiberglass prevents cracking of polyurethane foam insulation on cryogenic vessels			<b>RHENIUM</b>		
M-FS-20058	B68-10406	02	Reinforced thermal-shock resistant ceramics		
<b>RESINS</b>			LEWIS-10376	B68-10085	03
High-temperature bearing lubricants			Fabrication techniques developed for small-diameter, thin-wall tungsten and tungsten alloy tubing		
LEWIS-10408	B68-10249	05	ARG-10100	B68-10284	05
<b>RESISTANCE</b>			Nickel base alloy with improved stress rupture properties		
Studies in zirconium oxidation			LEWIS-10283	B68-10344	03
ARG-10099	B68-10199	03	<b>RHENIUM ALLOYS</b>		
Welder analyzer			Tungsten-rhenium alloy thermocouples effective for high-temperature measurement		
MSC-12068	B68-10242	01	ARG-10059	B68-10109	03
Low energy ohmmeter can be used to test sensitive circuits, other meters			<b>RING STRUCTURES</b>		
SAN-10013	B68-10269	01	Mass loading effects on vibrated ring and shell structures		
<b>RESISTANCE HEATING</b>			M-FS-14979	B68-10532	03
Isotopically pure magnesium isotope-24 is prepared from magnesium-24 oxide			<b>RINGS</b>		
ARG-10154	B68-10293	02	Shock-absorbing caster wheel is simple and compact		
<b>RESISTANCE THERMOMETERS</b>			SAN-10019	B68-10266	05
Viscosity and density of methanol/water mixtures at low temperatures			<b>ROCKET-BORNE PHOTOGRAPHY</b>		
M-FS-14991	B68-10274	03	Rocket engine nozzle photographic system		
<b>RESISTORS</b>			NPO-10174	B68-10113	02
Gyrator-type circuits replace ungrounded inductors			<b>ROCKET ENGINE DESIGN</b>		
XAC-10608	B68-10084	01	Rocket engine analog simulation		
Moebius resistor is noninductive and nonreactive			M-FS-14511	B68-10511	01
SAN-10020	B68-10267	01	<b>ROCKET ENGINES</b>		
<b>RESOLUTION</b>			Two-fluid, impinging-sheet injector		
Circuit enhances vertical resolution in raster scanning systems			NPO-10547	B68-10338	05
MSC-12123	B68-10121	01	Rocket engine analog simulation		
Improved gas ring laser			M-FS-14511	B68-10511	01
MSC-11584	B68-10304	02	<b>ROCKET EXHAUST</b>		
<b>RESONANCE</b>			General computer program for calculation of radiation from inhomogeneous, nonisobaric, nonisothermal rocket exhaust plume		
Improved atomic resonance gas cell for use in frequency standards			M-FS-14314	B68-10044	06
MSC-11666	B68-10230	01	Infrared spectroradiometer for rocket exhaust analysis		
<b>RESOURCES</b>			M-FS-14357	B68-10081	02
Computer program conducts facilities utilization and occupancy survey			Plume radiation program		
NPO-10438	B68-10137	06	M-FS-13202	B68-10447	06
<b>RESPIRATORY IMPEDANCE</b>			<b>ROCKS</b>		
Automatic patient respiration failure detection system with wireless transmission			Preparing rock powder specimens of controlled size distribution		
ARC-10174	B68-10365	01	NPO-10007	B68-10297	05
<b>RESPIRATORY RATE</b>			<b>RODS</b>		
High- and low-pressure pneumotachometers			Fiberglass-reinforced structural materials for aerospace application		
			M-FS-14806	B68-10360	03

## ROLL FORMING

Roll diffusion bonding of titanium alloy  
panels  
M-FS-14743 B68-10161 05

## ROLLER BEARINGS

Bearings use dry self-lubricating cage  
materials  
LEWIS-10432 B68-10165 05

## ROLLING CONTACT LOADS

High-temperature bearing lubricants  
LEWIS-10408 B68-10249 05

## ROOM TEMPERATURE

Encapsulation technique eliminates thermal  
stresses in welded electronic modules  
M-FS-14581 B68-10307 01

## ROTATING BODIES

Between-bearing shaft seal, a concept  
M-FS-18179 B68-10286 05

Improved gas ring laser  
MSC-11584 B68-10304 02

High-speed pulse camera  
MSC-11353 B68-10329 02

## ROTATING CYLINDERS

X-ray film holder permits single  
continuous picture of tubing joint  
LEWIS-10382 B68-10343 05

Compact rotating cup anemometer  
NPD-10563 B68-10436 01

## ROTATING MIRRORS

High-speed camera synchronization  
M-FS-18062 B68-10282 02

## ROTATING SHAFTS

Spiral-grooved shaft seals substantially  
reduce leakage and wear  
LEWIS-10397 B68-10270 05

Miniature paint-spray gun for recessed  
areas  
MSC-13060 B68-10387 05

## ROTATING STALLS

Cooled miniature pressure transducers  
effective at high temperatures  
LEWIS-10401 B68-10370 01

## ROTATION

Swing arm carrier protects flexible lines  
during test item rotation  
MSC-11464 B68-10037 05

Gimbal angle sensor  
GSFC-10305 B68-10315 01

## ROTORS

Shallow grooves in journal improve air  
bearing performance  
LEWIS-10396 B68-10134 05

Laser system used for dynamic balancing of  
gyros  
M-FS-12218 B68-10225 05

Acoustic wave analysis  
M-FS-18076 B68-10265 02

## RUBBER

X-ray film holder permits single  
continuous picture of tubing joint  
LEWIS-10382 B68-10343 05

## RUBIDIUM

Improved atomic resonance gas cell for use  
in frequency standards  
MSC-11666 B68-10230 01

## RUBY

Improved traveling wave maser amplifier  
NPD-10548 B68-10244 01

## RUBY LASERS

Laser system used for dynamic balancing of  
gyros  
M-FS-12218 B68-10225 05

Coolants with selective optical filtering  
characteristics for ruby laser applications  
M-FS-20188 B68-10508 02

## RUNGE-KUTTA METHOD

One-dimensional reacting gas nonequilibrium  
performance program  
MSC-11777 B68-10375 06

## RUPTURING

Pneumatic raft automatically reforms after  
rupture of buoyant member  
MSC-11562 B68-10011 05

## S

## SADDLES (SUPPORTS)

Vertical boring mill capacity is increased  
M-FS-16196 B68-10530 05

## SAFETY

Ambient temperature catalyst for hydrogen  
ignition  
LEWIS-10551 B68-10520 03

## SAFETY DEVICES

Saran film is fire-retardant in oxygen  
atmosphere  
MSC-11604 B68-10177 03

Thermal protective visor for entering  
high temperature areas  
MSC-10285 B68-10277 05

Solid state high-voltage pulser operates  
with low supply voltage  
M-FS-14034 B68-10308 01

## SAFETY FACTORS

Quick-attach clamp  
XFR-05421 B68-10250 05

Low energy ohmmeter can be used to test  
sensitive circuits, other meters  
SAN-10013 B68-10269 01

Hydrogen safety manual  
LEWIS-10487 B68-10323 01

Chemistry laboratory safety manual  
available  
SAN-10030 B68-10419 03

## SAMPLERS

Vacuum probe sampler removes micron-sized  
particles from surfaces  
SAN-10003 B68-10231 04

## SAMPLING

The X square statistic and goodness of fit  
test  
GSFC-10547 B68-10136 02

Preparing rock powder specimens of  
controlled size distribution  
NPD-10007 B68-10297 05

Failure rates for accelerated acceptance  
testing of silicon transistors  
ERC-10198 B68-10541 01

## SANDWICH STRUCTURES

Shock-absorbing caster wheel is simple and  
compact  
SAN-10019 B68-10266 05

Thermal protective visor for entering  
high temperature areas  
MSC-10285 B68-10277 05

## SAPPHIRE

Indium adhesion provides quantitative  
measure of surface cleanliness  
SAN-10024 B68-10342 01



## SATELLITE INSTRUMENTS

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SATELLITE INSTRUMENTS				SAN-10007	B68-10211	05
Charts designate probable future oceanographic research fields						
M-FS-20202	B68-10397	01		SEALERS		
SATELLITE TRANSMISSION				Inspection criteria ensure quality control of parallel gap soldering	B68-10257	05
Fully automatic telemetry data processor				M-FS-14530		
GSFC-10576	B68-10336	01		Electron beam selectively seals porous metal filters	B68-10331	05
SATURN LAUNCH VEHICLES				LEWIS-10162		
Accurate digital technique simulates flight control system				Cooled miniature pressure transducers effective at high temperatures	B68-10370	01
M-FS-14787	B68-10569	02		LEWIS-10401		
SATURN 5 LAUNCH VEHICLES				SEALING		
New method for critical failure prediction of complex systems				Heat-shrink plastic tubing seals joints in glass tubing	B68-10040	05
M-FS-14133	B68-10252	02		LEWIS-10329		
Improved technique for digital simulation of bending and slosh phenomena				Inspection criteria ensure quality control of parallel gap soldering	B68-10257	05
M-FS-14788	B68-10570	02		M-FS-14530		
SCALE (RATIO)				Electron beam selectively seals porous metal filters	B68-10331	05
Fast method for obtaining scale dimensions on tape-controlled milling machine				LEWIS-10162		
MSC-11609	B68-10047	05		Hydrostatic testing of porous assemblies	B68-10439	05
SCALE MODELS				M-FS-18298		
High-torque precision stepping drive				SEALS (STOPPERS)		
M-FS-14772	B68-10549	05		Asbestos and Inconel combined to form hot-gas seal	B68-10162	05
SCALERS				M-FS-14004		
Digital filter suppresses effects of nonstatistical noise bursts on multichannel scaler digital averaging systems				Spiral-grooved shaft seals substantially reduce leakage and wear	B68-10270	05
ARG-90143	B68-10193	06		LEWIS-10397		
SCALING				Between-bearing shaft seal, a concept	B68-10286	05
Locating and sealing air leaks in multiroomed buildings				M-FS-18179		
NUC-10304	B68-10024	05		Hand-tightened, high-pressure seal	B68-10417	05
SCANNERS				M-FS-18416		
Development of mechanized ultrasonic scanning system				Evaluation of a fluorocarbon plastic used in cryogenic valve seals	B68-10523	03
M-FS-13638	B68-10004	05		M-FS-18189		
Circuit enhances vertical resolution in raster scanning systems				Tube joint leak repair coupling	B68-10540	05
MSC-12123	B68-10121	01		MSC-15022		
Improved electro-optical tracking system				SELECTIVITY		
M-FS-14791	B68-10311	01		Study of behavior of sterols at interfaces	B68-10281	03
System for measuring spatial distribution of ejected droplets, a concept				ARG-10085		
NPO-10185	B68-10402	01		SELF SEALING		
SCANNING				Fire retardant foams developed to suppress fuel fires	B68-10358	03
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M-FS-20084	B68-10357	01		SEMICONDUCTOR DEVICES		
SCHEDULING				Bilateral, zero-impedance static semiconductor switch	B68-10118	01
Automatic planning concept - An analysis of optimum scheduling				LEWIS-10129		
M-FS-14198	B68-10127	06		Semiconductor ac static power switch	B68-10224	01
DSN seven day/twelve week schedule program				LEWIS-10344		
NPO-10752	B68-10410	06		Feasibility study of wireless power transmission systems	B68-10309	01
SCINTILLATION				M-FS-14691		
Tunnel diode circuit used as nanosecond-range time marker				CIRCUS--A digital computer program for transient analysis of electronic circuits	B68-10416	06
ARG-90164	B68-10173	01		M-FS-15002		
SCREEN EFFECT				SEMICONDUCTOR JUNCTIONS		
Luminescent screen composition for cathode ray tubes				Pressure-sensitive bonded junction transducers	B68-10563	01
ERC-19	B68-10056	01		ERC-10087		
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Quick-attach clamp				Silicon strain sensors enable pressure measurement at cryogenic temperatures	B68-10262	01
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Proposed gas generation assembly would recover deeply submerged objects						

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Electron beam recrystallization of amorphous semiconductor materials LEWIS-10443	B68-10556	02	Improved electromechanical master-slave manipulator ARG-10027	B68-10372	05
Reliable method for testing gross leaks in semiconductor component packages ERC-10150	B68-10562	01	Low friction servo valve LEWIS-10574	B68-10440	05
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Detection sensitivities in 3-8 MeV neutron activation ARG-10210	B68-10298	02	Welding skate with computerized controls M-FS-20224	B68-10566	01
Temperature or pressure controller LEWIS-10297	B68-10337	01	<b>SERVOMECHANISMS</b> Alternating current electromagnetic servo induction meter XFR-03838	B68-10100	01
<b>SENSORS</b> Improved fuel-cell-type hydrogen sensor M-FS-14656	B68-10263	01	Low-cost, fast-response drive circuit for electromagnetic torque motors LEWIS-10143	B68-10386	01
Gimbal angle sensor GSFC-10305	B68-10315	01	Digital laser-beam deflection sensor M-FS-14785	B68-10525	01
Ultrasonic temperature measuring device LEWIS-10446	B68-10319	01	<b>SERVOMOTORS</b> Concept for sleeve induction motor with 1-msec mechanical time constant ARG-10124	B68-10185	01
Fluidic-thermochromic display device ERC-10031	B68-10350	01	Improved electromechanical master-slave manipulator ARG-10027	B68-10372	05
System for measuring spatial distribution of ejected droplets, a concept NPO-10185	B68-10402	01	<b>SEX</b> Experimental study and evaluation of radioprotective drugs ARG-10196	B68-10320	04
<b>SEPARATION</b> Vibration testing and dynamic studies of relays M-FS-14542	B68-10268	01	<b>SHAFTS (MACHINE ELEMENTS)</b> Shallow grooves in journal improve air bearing performance LEWIS-10396	B68-10134	05
Spiral-grooved shaft seals substantially reduce leakage and wear LEWIS-10397	B68-10270	05	Between-bearing shaft seal, a concept M-FS-18179	B68-10286	05
<b>SEPARATORS</b> Hydrostatic testing of porous assemblies M-FS-18298	B68-10439	05	Remotely operated gripper provides vertical control rod movement ARG-10160	B68-10359	05
Separator for alkaline batteries GSFC-10173	B68-10557	03	<b>SHAKERS</b> Shock and vibration response of multistage structure M-FS-14972	B68-10353	05
<b>SEQUENCING</b> Computer program offers new method for constructing periodic orbits in nonlinear dynamical systems M-FS-14654	B68-10217	06	<b>SHEARS</b> Versatile impact hand tool M-FS-20140	B68-10371	05
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Acquisition of pseudonoise signals by sequential estimation M-FS-13898	B68-10258	01	<b>SHELL STABILITY</b> Static structural analysis of shell-type structures MSC-11555	B68-10066	03
Simultaneous message framing and error detection MSC-12001	B68-10330	01	Computer program analyzes Buckling Of Shells Of Revolution with various wall construction, BOSOR LANGLEY-10290	B68-10226	06
<b>SEQUENTIAL ANALYSIS</b> Study of optimum discrete estimators in measurement analysis M-FS-14915	B68-10348	02	<b>SHELLS (STRUCTURAL FORMS)</b> Mass loading effects on vibrated ring and shell structures M-FS-14979	B68-10532	03
<b>SEQUENTIAL COMPUTERS</b> Concept for simplified serial digital decoder NPO-10150	B68-10045	06			
<b>SERVOAMPLIFIERS</b> Closed circuit TV system automatically guides welding arc M-FS-20084	B68-10357	01			

## SHIELDING

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## SHIELDING

Mechanical shielding reduces weld surface cracking in 6061 T6 aluminum  
MSC-11494 B68-10022 05

Rocket engine nozzle photographic system  
NPO-10174 B68-10113 02

X-ray film holder permits single continuous picture of tubing joint  
LEWIS-10382 B68-10343 05

**SHIFT REGISTERS**  
Parallel-to-serial biphase-data converter  
MSC-11600 B68-10241 01

Acquisition of pseudonoise signals by sequential estimation  
M-FS-13898 B68-10258 01

Simultaneous message framing and error detection  
MSC-12001 B68-10330 01

Fluidic-thermochromic display device  
ERC-10031 B68-10350 01

**SHOCK ABSORBERS**  
Sleeved damper limits spring surging  
MSC-12071 B68-10111 05

Pressure variable orifice for hydraulic control valve  
MSC-11323 B68-10120 05

Shock-absorbing caster wheel is simple and compact  
SAN-10019 B68-10266 05

**SHOCK RESISTANCE**  
Reinforced thermal-shock resistant ceramics  
LEWIS-10376 B68-10085 03

**SHOCK WAVE PROPAGATION**  
Shock and vibration response of multistage structure  
M-FS-14972 B68-10353 05

**SHORT CIRCUITS**  
Current-limiting voltage regulator  
MSC-11824 B68-10305 01

**SHOT PEENING**  
Nondestructive method for measuring residual stresses in metals, a concept  
KSC-10237 B68-10378 03

**SIGNAL DISTORTION**  
Harmonic distortion analyzer speeds setup of magnetic tape recorders  
GSFC-10198 B68-10254 01

Improved communication system for large operations center  
M-FS-15016 B68-10529 01

**SIGNAL GENERATORS**  
Technique increases storage capacity in camera tube target  
MSC-11599 B68-10213 01

Harmonic distortion analyzer speeds setup of magnetic tape recorders  
GSFC-10198 B68-10254 01

Acquisition of pseudonoise signals by sequential estimation  
M-FS-13898 B68-10258 01

High-speed camera synchronization  
M-FS-18062 B68-10282 02

Dynamic linearity measurement technique  
KSC-10186 B68-10290 01

A 35 GHz solid state transmitter/driver  
M-FS-20152 B68-10545 01

## SIGNAL MIXING

Improved communication system for large operations center  
M-FS-15016 B68-10529 01

## SIGNAL PROCESSING

Portable Pulse Code Modulation /PCM/  
MSC-11369 B68-10106 01

Analysis and design of a class-D amplifier  
M-FS-14803 B68-10313 01

## SIGNAL TO NOISE RATIOS

Improved phase locked loop receiver  
GSFC-09561 B68-10008 01

Harmonic distortion analyzer speeds setup of magnetic tape recorders  
GSFC-10198 B68-10254 01

Acquisition of pseudonoise signals by sequential estimation  
M-FS-13898 B68-10258 01

Laser Doppler gas-velocity instrument  
M-FS-20039 B68-10349 02

Readout system for radiation detector  
MSC-90180 B68-10501 01

## SILICATES

Manganese-alumina-ceramic glass eliminates rigid controls necessary in bonding metals to ceramics  
SAN-10012 B68-10204 03

Thermal conductivity and dielectric constant of silicate materials  
M-FS-14856 B68-10351 03

## SILICON

Small, low power analog-to-digital converter  
M-FS-13954 B68-10016 01

Silicon solar cell monitors high temperature furnace operation  
NUC-10163 B68-10148 01

Silicon strain sensors enable pressure measurement at cryogenic temperatures  
M-FS-14703 B68-10262 01

Temperature or pressure controller  
LEWIS-10297 B68-10337 01

Improved process for epitaxial deposition of silicon on prediffused substrates  
M-FS-14910 B68-10390 03

Electron beam recrystallization of amorphous semiconductor materials  
LEWIS-10443 B68-10556 02

## SILICON ALLOYS

Weld microfissuring in Inconel 718 minimized by minor elements  
M-FS-18185 B68-10251 03

## SILICON CARBIDES

UV detector monitors organic contamination of optical surfaces  
M-FS-20246 B68-10413 01

Ambient temperature catalyst for hydrogen ignition  
LEWIS-10551 B68-10520 03

## SILICON DIOXIDE

Study of behavior of sterols at interfaces  
ARG-10085 B68-10281 03

Miniaturized King furnace permits absorption spectroscopy of small samples  
ARG-10177 B68-10418 02

## SILICON FILMS

Silicon oxide films grown in microwave discharge

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<b>SILICON OXIDES</b>			Indium adhesion provides quantitative measure of surface cleanliness		
Silicon oxide films grown in microwave discharge			SAN-10024	B68-10342	01
M-FS-14634	B68-10171	01	<b>SINTERING</b>		
Graphite cloth facilitates vacuum evaporation of silicon monoxide			Electron beam selectively seals porous metal filters		
M-FS-14764	B68-10256	03	LEWIS-10162	B68-10331	05
<b>SILICON RADIATION DETECTORS</b>			Grain growth inhibitor for porous tungsten materials		
Silicon surface barrier detectors used for liquid hydrogen density measurement			LEWIS-10535	B68-10527	03
M-FS-14115	B68-10166	01	Method for controlling density and permeability of sintered powdered metals		
<b>SILICON TRANSISTORS</b>			LEWIS-10393	B68-10528	03
New microelectronic power amplifier			<b>SITES</b>		
M-FS-13621	B68-10073	01	Site survey for optimum location of Optical Communication Experimental Facility		
Failure rates for accelerated acceptance testing of silicon transistors			M-FS-13155	B68-10050	06
ERC-10198	B68-10541	01	<b>SIZE (DIMENSIONS)</b>		
<b>SILICONE RUBBER</b>			High-torque power wrench, a concept		
Encapsulation technique eliminates thermal stresses in welded electronic modules			M-FS-18194	B68-10299	05
M-FS-14581	B68-10307	01	<b>SIZE DETERMINATION</b>		
Battery-package design provides for cell cooling and constraint			Flare angles measured with ball gage		
MSC-11839	B68-10398	05	M-FS-14690	B68-10030	01
<b>SILICONES</b>			<b>SIZING SCREENS</b>		
Effects of surface preparation on quality of aluminum alloy weldments			Electroformed screens with uniform hole size		
M-FS-13152	B68-10302	03	LEWIS-10117	B68-10107	05
Compressible sleeve provides automatic centering for grinding or turning of cylinders			<b>SLEEVES</b>		
SAN-10021	B68-10318	05	Tube swaging device uses explosive force		
<b>SILVER</b>			LANGLEY-10092	B68-10235	05
High-voltage pulse generator developed for wide-gap spark chambers			Dual rate pressure relief valve		
ARG-10136	B68-10283	01	MSC-11606	B68-10237	05
Electromotive series established for metals used in aerospace technology			Fabrication techniques developed for small-diameter, thin-wall tungsten and tungsten alloy tubing		
M-FS-18327	B68-10385	03	ARG-10100	B68-10284	05
Electrolytic silver ion cell sterilizes water supply			Between-bearing shaft seal, a concept		
MSC-11827	B68-10555	01	M-FS-18179	B68-10286	05
<b>SILVER COMPOUNDS</b>			Compressible sleeve provides automatic centering for grinding or turning of cylinders		
Preparation of silver-activated zinc sulfide thin films			SAN-10021	B68-10318	05
GSFC-10687	B68-10271	03	<b>SLIDING</b>		
<b>SILVER NITRATES</b>			Dual rate pressure relief valve		
Preparation of silver-activated zinc sulfide thin films			MSC-11606	B68-10237	05
GSFC-10687	B68-10271	03	<b>SLIDING FRICTION</b>		
<b>SILVER ZINC BATTERIES</b>			Capacitance-coupled wiper increases potentiometer life		
Separator for alkaline batteries			ARC-10060	B68-10175	01
GSFC-10173	B68-10557	03	<b>SLIP CASTING</b>		
<b>SIMULATION</b>			Tungsten fiber-reinforced nickel superalloy		
Simulated hailstone fabrication and use in testing weatherability of structures			LEWIS-10424	B68-10369	03
NPD-10783	B68-10552	03	<b>SLOTS</b>		
<b>SIMULATORS</b>			Tensile testing grips ensure uniform loading of bimetal tubing specimens		
Fully automatic telemetry data processor			LEWIS-10267	B68-10248	05
GSFC-10576	B68-10336	01	Gimbal angle sensor		
<b>SINE WAVES</b>			GSFC-10305	B68-10315	01
Vibration testing and dynamic studies of relays			<b>SLUDGE</b>		
M-FS-14542	B68-10268	01	High-temperature bearing lubricants		
Modified sine bar device measures small angles with high accuracy			LEWIS-10408	B68-10249	05
GSFC-438	B68-10322	02	<b>SLURRIES</b>		
			Tungsten fiber-reinforced nickel superalloy		
			LEWIS-10424	B68-10369	03
			Hydrostatic testing of porous assemblies		
			M-FS-18298	B68-10439	05

## SODIUM

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<b>SODIUM</b>					
Proposed gas generation assembly would recover deeply submerged objects SAN-10007	B68-10211	05	M-FS-14531	B68-10310	01
			Fixture facilitates soldering operations M-FS-14456	B68-10573	05
<b>SODIUM ALLOYS</b>			<b>SOLENOIDS</b>		
New bimetallic EMF cell shows promise in direct energy conversion ARG-10183	B68-10415	01	High-torque power wrench, a concept M-FS-18194	B68-10299	05
<b>SODIUM CHLORIDES</b>			High-speed pulse camera MSC-11353	B68-10329	02
Preparation of silver-activated zinc sulfide thin films GSFC-10687	B68-10271	03	Temperature or pressure controller LEWIS-10297	B68-10337	01
Electromotive series established for metals used in aerospace technology M-FS-18327	B68-10385	03	<b>SOLID LUBRICANTS</b>		
A rapid stress-corrosion test for aluminum alloys M-FS-20175	B68-10536	03	Bearings use dry self-lubricating cage materials LEWIS-10432	B68-10165	05
<b>SODIUM COMPOUNDS</b>			Application of the solid lubricant molybdenum disulfide by sputtering LEWIS-10544	B68-10340	03
Improved process for making thin-film sodium niobate capacitors MSC-11231	B68-10163	01	<b>SOLID STATE</b>		
Detection sensitivities in 3-8 MeV neutron activation ARG-10210	B68-10298	02	Electronic aperture control devised for solid state imaging system M-FS-12428	B68-10028	01
<b>SOLAR CELLS</b>			<b>SOLID STATE DEVICES</b>		
Silicon solar cell monitors high temperature furnace operation NUC-10163	B68-10148	01	Concept for sleeve induction motor with 1-msec mechanical time constant ARG-10124	B68-10185	01
Automatic solar lamp intensity control system XGS-10017	B68-10399	01	Solid state high-voltage pulser operates with low supply voltage M-FS-14034	B68-10308	01
Electron beam recrystallization of amorphous semiconductor materials LEWIS-10443	B68-10556	02	Temperature or pressure controller LEWIS-10297	B68-10337	01
<b>SOLAR ENERGY</b>			A 35 GHz solid state transmitter/driver M-FS-20152	B68-10545	01
Electrochemical cell has internal resistive heater element GSFC-10358	B68-10325	01	<b>SOLIDIFICATION</b>		
<b>SOLAR ORBITS</b>			Nickel-base superalloy*s excellent properties promote its service to 2200 degrees F LEWIS-10355	B68-10380	03
Computer program for interplanetary conic patching M-FS-14296	B68-10033	06	<b>SOLIDS</b>		
<b>SOLAR RADIATION</b>			Bimetal sensor averages temperature of nonuniform profile LEWIS-10362	B68-10007	01
Structural thermal-control coatings NPO-10785	B68-10553	03	Thermal conductivity and dielectric constant of silicate materials M-FS-14856	B68-10351	03
<b>SOLAR SENSORS</b>			<b>SOLUBILITY</b>		
Telescope dome control system automatically tracks sun MSC-10966	B68-10521	02	Metabolic and toxicological effects of water-soluble xenon compounds are studied ARG-90239	B68-10076	04
<b>SOLAR SIMULATORS</b>			<b>SOLUTION</b>		
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<b>SOLDERED JOINTS</b>			<b>SOLUTIONS</b>		
Inspection criteria ensure quality control of parallel gap soldering M-FS-14530	B68-10257	05	Electromotive series established for metals used in aerospace technology M-FS-18327	B68-10385	03
<b>SOLDERING</b>			<b>SOLVENTS</b>		
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Miniature pressure transducer for stressed member application MSC-11869	B68-10246	01	<b>SOUND AMPLIFICATION</b>		
Inspection criteria ensure quality control of parallel gap soldering M-FS-14530	B68-10257	05	Noise figure measurement concept for acoustic amplifiers GSFC-10066	B68-10272	01
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## SPECTRORADIOMETERS

I-85

## SPECTROSCOPY

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## SPECTROSCOPY

Miniaturized King furnace permits  
absorption spectroscopy of small samples  
ARG-10177 B68-10418 02

## SPECTRUM ANALYSIS

Improved optical diffractometer  
MSC-12055 B68-10071 02

Procedure developed for reporting  
fast-neutron exposure  
ARG-10035 B68-10190 02

Improved relay optical element for  
spectroradiometer using cryogenically  
cooled detector  
MSC-11688 B68-10245 02

Laser Doppler gas-velocity instrument  
M-FS-20039 B68-10349 02

## SPEED CONTROL

Automatic contour welder incorporates  
speed control system  
M-FS-14574 B68-10091 01

## SPHERES

Optical integrating sphere operates at  
visible and infrared wavelengths  
M-FS-14248 B68-10126 02

## SPIRALS

Spiral-grooved shaft seals substantially  
reduce leakage and wear  
LEWIS-10397 B68-10270 05

## SPONTANEOUS COMBUSTION

Evaluation of ignition mechanisms in  
selected nonmetallic materials  
MSC-11645 B68-10167 03

Saran film is fire-retardant in oxygen  
atmosphere  
MSC-11604 B68-10177 03

## SPOT WELDS

Miniature pressure transducer for stressed  
member application  
MSC-11869 B68-10246 01

Cooled miniature pressure transducers  
effective at high temperatures  
LEWIS-10401 B68-10370 01

## SPRAY NOZZLES

Miniature paint-spray gun for recessed  
areas  
MSC-13060 B68-10387 05

## SPRAYED COATINGS

Miniature paint-spray gun for recessed  
areas  
MSC-13060 B68-10387 05

## SPRAYERS

System for measuring spatial distribution of  
ejected droplets, a concept  
NPD-10185 B68-10402 01

## SPRAYING

Fire retardant foams developed to suppress  
fuel fires  
ARC-10098 B68-10358 03

High-emittance coatings on metal substrates  
LEWIS-10325 B68-10381 03

## SPRINGS (ELASTIC)

Sleeved damper limits spring surging  
MSC-12071 B68-10111 05

Dual rate pressure relief valve  
MSC-11606 B68-10237 05

Dynamically stable check valve concept for  
wide flow range  
M-FS-14579 B68-10247 05

Quick-attach clamp

XFR-05421 B68-10250 05

Vibration testing and dynamic studies of  
relays  
M-FS-14542 B68-10268 01

Contact-spring forming machine for flat  
conductor cable receptacles  
M-FS-20126 B68-10550 05

## SPUTTERING

Application of the solid lubricant  
molybdenum disulfide by sputtering  
LEWIS-10544 B68-10340 03

Electron beam recrystallization of amorphous  
semiconductor materials  
LEWIS-10443 B68-10556 02

## STABILITY

Real fluid properties of normal and  
parahydrogen  
LEWIS-10458 B68-10361 06

## STABILITY DERIVATIVES

Computer program determines system  
stability /DIGSTA/  
LEWIS-10395 B68-10216 06

## STABILITY TESTS

Computer program analyzes Buckling Of  
Shells Of Revolution with various wall  
construction, BOSOR  
LANGLEY-10290 B68-10226 06

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ELAS - A general purpose computer program  
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NPD-10598 B68-10187 06

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member application  
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Conceptual hermetically sealed elbow  
actuator  
M-FS-14710 B68-10300 05

Application of the solid lubricant  
molybdenum disulfide by sputtering  
LEWIS-10544 B68-10340 03

Indium adhesion provides quantitative  
measure of surface cleanliness  
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High-emittance coatings on metal substrates  
LEWIS-10325 B68-10381 03

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beam heating  
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Telescope dome control system automatically  
tracks sun  
MSC-10966 B68-10521 02

## STARTERS

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M-FS-20140 B68-10371 05

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measurement analysis  
M-FS-14915 B68-10348 02

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pressure calibration  
M-FS-14672 B68-10264 01

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aluminum alloy 6061  
M-FS-18337 B68-10383 05

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of complex systems  
M-FS-14133 B68-10252 02

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gas thermodynamic data  
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analysis  
ERC-10209 B68-10457 06

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testing of silicon transistors  
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in turbine stator components  
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